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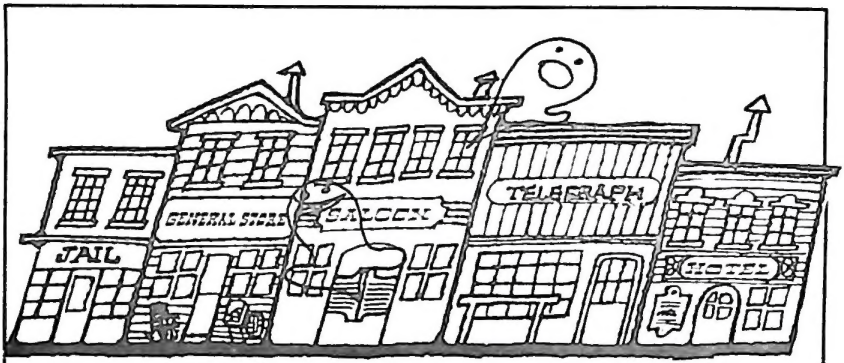

GHOST TOWN

by Scott Adams

Scott's long-awaited 9th adventure is here! Thirteen treasures are hidden somewhere in the GHOST TOWN. You'll need more resourcefulness than ever to find them before sunset. Be ready for a town full of surprises and some REAL ghosts! Bring along a sense of humor, but be alert for danger as well. If you live so long, you MAY learn the answer to the tantalizing question:

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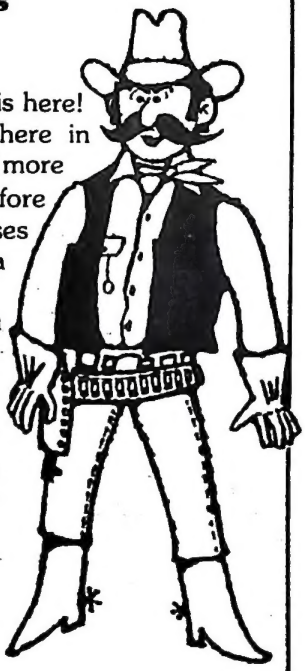

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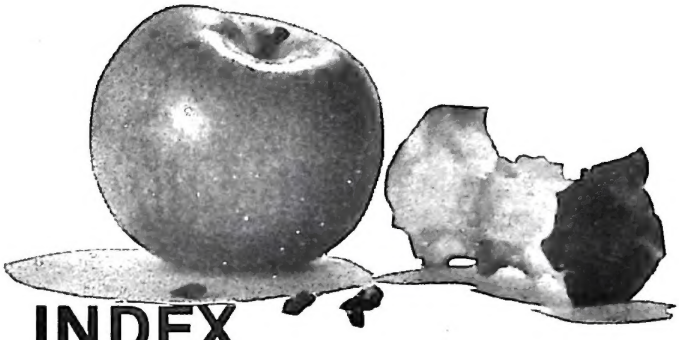

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Our feature this month is an already well-known program called Pork Barrel, written by George Blank. An excellent job of converting the program for the Apple was done by Murray Summers. Pork Barrel is an excellent political simulation, challenging and fun as a game, and useful as an educational tool. (For those of you who didn't know, "Pork Barrel" legislation is that which is designed to benefit your own district.) This month we also have 2 other game features: NO MIS, and HORSE RACE; and we continue our look at Apple Graphics in Art, from Joan Truckenbrod, our ROM the Robot animation series, by Bill Smith, and music, with a submission from Timothy and Ping Patrick. We also have a routine that allows you to print a facsimile of the low resolution graphics screen on your printer, using black and white shading. "Intimate Instructions in Integer BASIC, although absent in this issue, will continue next month."

You may be relieved to know that the awaited Apple III does not replace the Apple II. It is directed toward the higher priced business end of the market. The Apple II is alive and well. See Mike Sullivan's review inside. I talked with Mike a few days before print deadline and some information that didn't quite make his copy deadline was that the Apple III does support 16-color graphics and color text, mixed in any manner. The chip used is a 6502A which apparently has some characteristics of a 16-bit processor, and some of an 8-bit processor.

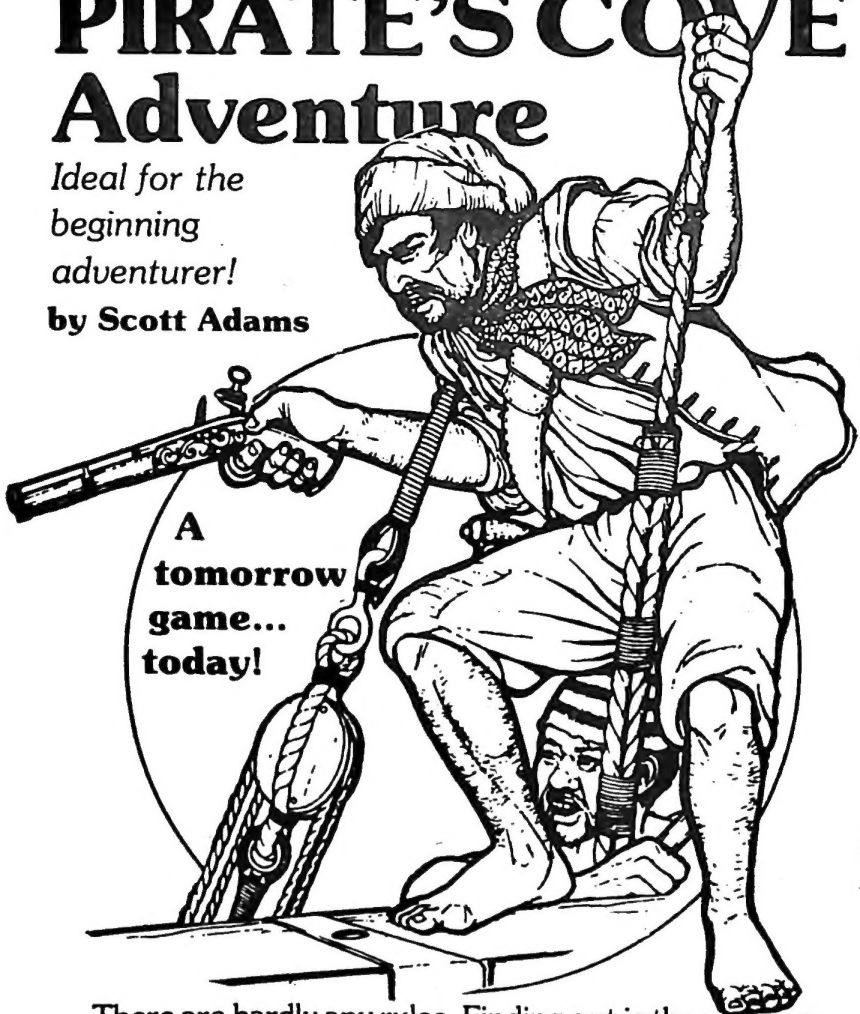
Lastly, I hope you notice a change in the quality of our listings. They do take more space in the magazine, but will hopefully make the programs easier to type into your computer.

We're always on the lookout for good programs. If you have anything that might be of interest to us, we'll review it if you send it on a good cassette or disk.

PIRATE'S COVE Adventure

Ideal for the beginning adventurer!

by Scott Adams



There are hardly any rules. Finding out is the game, or is this actually a game? It has no practical use so it must be a game, right? Confused? You'll feel like you're in control of HAL, that famous schizophrenic computer from "2001", only not quite as sharp. Now available on tape, 24K, machine language. **$14.95**

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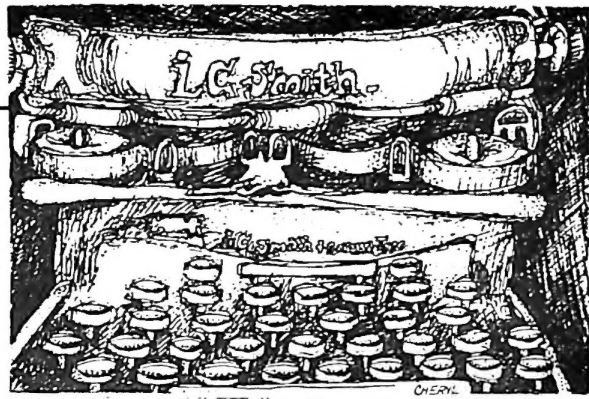

EDITORIAL

User-proofing, goof-proofing, crash-proofing, error-checking, error-handling,...there are many names for it, and to write a good computer program you must be conscious of it. One of the most frustrating experiences, especially for a novice user, is to accidentally press a wrong key and see a program go haywire, or have it disappear into the murky depths of RAM looking for an instruction that isn't there, or find a cryptic message appear on the screen as the program terminates. ('Cryptic' is in the eyes of the beholder...). The most valuable critic I had in my earlier programming was a gentleman who would try running programs of mine and intentionally not follow instructions 'just to see what they would do'. He would always do this in cases where it was painfully obvious what the user should type: questions were clearly stated and options prominently specified. But if the program asked for a choice 1-4, he would type 'M', or '-78', or even just 'RETURN'! Invariably he would find a place where to even the simplest yes/no question the program did not anticipate an answer of -956, and it would drift off into Neverneverland—to which he would agonizingly mumble something about 'this program should be fixed' and then the ever occurring 'maybe you can get the program to do this and this and that...'

User-proofing does take time and awareness. It is of infinite help to have someone who has yet to see your program try it, without coaching from the author. Once you have spent the time to write a good program you are no longer able to evaluate it objectively. Things that are obvious to you because you've been next to them for so long may not necessarily be so to your audience. Hence you may find yourself doing rewrite after rewrite, modification after modification. The result, however, is the difference between an amateur and a professional program.

Here are a few things you can do to your own programs to make them more user-proof:

Check all items that are input from the user for range. Don't accept a zero if you are going to divide by that number. If the choices are 1 to 4, put in a statement like the following:

```
10 INPUT "1-4?";C : IF C <1 OR
   C> 4 THEN 10
```

which allows the user to input a value, C, and immediately checks the range. If the answer is something unexpected, the question is asked again. (Of course, you'll probably want to say more in your question than '1-4?'.) The semicolon should be a comma if you are using Integer BASIC. If the user input is going to directly affect the low resolution graphics screen, check that you'll never try to plot a point with a coordinate outside the range 0 to 39; if using the high resolution screen, the range is 0 to 279 for X, and 0 to 191 for Y.

A similar situation occurs when asking a yes or no question. Thank God the habit of asking '1-YES, or 0-NO', developed on time-shared systems when BASIC did not yet handle character strings, has become virtually extinct! But we still have cases that some authors will accept a convenient Y or N, while others demand that you type the entire word, YES or NO. A nice way of appeasing everybody is by simply checking the first letter of the input, which would accept N, NO, NOPE, or NOT REALLY for a negative response (while also accepting NATURALLY and NICKEL...). The following Applesoft statements do this:

```
10 INPUT "your question
   here?";A$
20 IF LEFT$(A$,1) = "Y" THEN
statement number for positive
answer
30 IF LEFT$(A$,1) <> "N"
   THEN 10
40 your response to a negative
   answer here
```

Notice that these statements do not assume that if the user didn't answer YES that he or she answered NO. The Integer BASIC equivalent would again have a comma instead of the semicolon in the INPUT statement, LEFT$(A$,1) would be replaced by A$(1,1) both times, and <> would become #.

Another source of possible confusion for the user is the use of INPUT and GET (or equivalent PEEKing in Integer BASIC). Although the GET statement is a nice way of eliminating user keystrokes, it can occasionally cause a problem if the user, out of habit, presses [RETURN] anyway. The [RETURN] would then apply to the next user input, since Apple remembers the last key pressed. If the next question mishandles that [RETURN] undesired results may occur. The best solution, perhaps, is to remain as consistent as possible within any program; use either the GET statement or the INPUT statement consistently.

The RESET key, although an asset in most cases, can also result in frustration—especially in the bottom of the ninth with the score tied, two out, and the bases loaded. The monitor with Integer BASIC will not allow you to disable RESET. The Autostart monitor with Applesoft does allow a partial solution. The statements:

```
10  POKE 1010,102 : POKE 1011,
    213 : POKE 1012,112
```

will partially disable RESET. With these lines your program will ignore RESET, except that it will still put you back in text mode, return input/output to the keyboard and standard video display,

and beep. A few other things occur, which are explained on page 36 of the newer Apple II Reference Manual, but of most significance will be the switch to text mode. If important, graphics may be regained with timely occurrences of POKE - 16304,0 and one of the following: POKE - 16298,0 for LO-RES, or POKE - 16297,0 for HI-RES.

A final hint I can offer, unfortunately again only in Applesoft, is use of the ONERR GOTO statement. It should be used whenever there is the possibility of an error that is not immediately detectable through the user's input. The most noteworthy examples of this would be (1) when doing a calculation that is based on some combination of inputs, each of which is acceptable, but when combined cause a problem, and (2) when reading or writing to disk or tape and you cannot be certain what is out there (e.g. trying to read a non-existent file from disk). The ONERR GOTO statement allows you to keep these mistakes from stopping your program if you can anticipate such an error occurring and write an error handling routine. Be aware that when you use the ONERR statement it stays in effect for any error that occurs. It will even override standard error routines such as the one that tells you 'Invalid Input'. To reinstate normal error handling after the possible crisis has passed, use the statement POKE 216,0. If you wish to have your program go back to the line in error after an error handling routine that you've written, you may use either a GOTO statement or the statement:
RESUME.

The time taken to include checks like the above in your programs is the time that is most noticeable in the finished product. I make no pretense of having covered every possible device, and would welcome any additions. You know where I'm at.

Happy trails... mp

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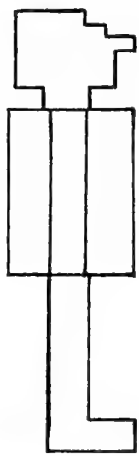
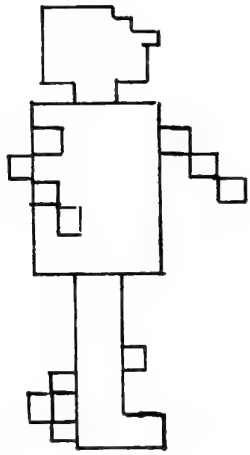




ROM THE ROBOT

by Bill Smith

PART 2

This month we will try to get ROM to move around the screen. Also, while we have already activated ROM enough for him to answer yes and no, he needs some additional methods to communicate with the outside world. (If there is a real world outside of the T.V. screen!).

For our new readers, a full listing of this program to date appears at the end, but if you want a full explanation of this little green man, try to get a copy of last month's SoftSide:Apple Edition magazine.

To have ROM march, we will need four more shapes defined: two different sets of arms and legs for marching left and two more in their mirror-image for marching right. As we already know all the SHAPE subroutines are defined relative to ROM's neck, to move him we just have to increment or decrement the X and Y coordinates of this point, depending on which direction we want him to go. Two problems spring to mind.— What happens if we try to move him sideways if he is presently facing front? OK for crabs, but not for robots! What if he reaches the sides or top of the screen and falls off (or worse, gets lost inside amongst all those cathode ray tubes and stuff).

Enough of this nonsense; let's write the code! (In the listing, the new sections of code are boxed.)

Lines 1100-1280

These lines define the shape of ROM's limbs in the two different directions he can march—limbs march right (LMR and LMR1) and—limbs march left (LML and LML1). These SHAPE subroutines are called together with limbs left (LL) and limbs right (LR) to form

the sequence of steps. For example, moving left requires the following shapes to be drawn and erased, LL,LML,LL,LML1,LL,LML, LL,LML1,LL,etc.

Lines 2050-2057

Forward March!—The first line finds which direction ROM is presently facing by checking the D (direction) variable. D=1 means facing right, D=2 means facing left and D=0 means facing front. If D=1 we jump forward to line 2052 where we increment the X co-ordinate, call the body and head SHAPE subroutines, and, together with the next two lines, set flags F and F1 to provide one of the three relevent limb positions. If D=2, we do much the same except at line 2055 we decrement the X co-ordinate and, of course, call the mirror-image sets of limbs in the next two lines. If D=0, we forget the whole idea of marching anywhere and POP ourselves out of the sub-routine setting variable A for the "shake head" command as we go back to the start of the MAIN LOOP.

Lines 2000-2001

Now that we have ROM marching around we need a way of stopping him; this is the halt (H) command which checks the direction which he is going, issues the appropriate command to himself, either left face (L) or right face (R), and them POP's out of the subroutine directly to the start of the MAIN LOOP for the command to be executed.

Lines 1940,1980,2040,2100,2060, 2170

Need changing to include the D or direction variable we have used to indicate the direction of each command.

Line 30

Needs changing to accept the four new commands from the keyboard. While we are doing it, let us put in Q for quit, as well.

This about completes ROM's movements for now. Maybe we should check to see that all is working; RUN the program and see if the "M", "C", "D" and "H" keys work.

An interesting point you may have noticed is that ROM is getting the first glimmerings of intelligence in that he can issue commands to himself by adjusting the A variable. For instance, if he does not know in which direction to march, he just stands shaking his head in disgust at the stupidity of humans who ask him to march but do not face him in the correct direction first. And, similarly, when told to halt, decides which direction he should remain facing.

Now, I expect if you have run the program you have noticed what happens when he reaches the edges of the scree, so let us write some more code in the MAIN LOOP section to detect and correct this problem.

Line 90

The detection line to see if ROM is near one of the four sides of the screen. If it is one of the side edges, it branches forward to line 92, or the top and bottom edges branch to line 94. If ROM is not near the edge, we return to the start of the MAIN LOOP.

Line 92

First we jump ROM back in one place toward the center of the screen to get him clear of this error condition, then the blink (B) command is issued to denote surprise that he was allowed so near (or maybe a pain in his rather large nose) before Returning to the MAIN LOOP.

Line 94

This line counteracts the climb/descend commands by incrementing or decrementing the Y coordinate accordingly.

A problem you may have noticed if you have tried to stop the program with a CTRL-C is that you are still looking at Page 2, so the prompt character (>) does not appear. A POKE-16300,0 will switch the screen from Page 2 to Page 1, but let us incorporate this in a new COMMAND subroutine called quit (Q).

Lines 2090-2096.

These lines allow for a neat ending to the program after the "Q" quit key has been depressed. The first line switches pages, calls for text, and clears the screen. The next prints a short message and then LOMEM is reset to normal so that if you plan to run some other program its variables will end up at the correct place in memory.

Three methods of allowing ROM to communicate with us have occurred to me. First, we already have him sending messages using sign language: nod, blink, shake, etc. Secondly, we can use the Apple speaker. Finally, we can get him to write messages.

Maybe in the future we will get him to speak some words, but for now let us just get him to quietly grunt (when his nose hits the edge of the screen) and, at the same time, leave a message.

The default mode of the Apple's GR command conveniently gives us room for four lines of text along the bottom of the screen; we should use them, remembering to wipe them out after we have finished in order to keep the display tidy.

Line 92

This side edge error line includes two GOSUB's: one for the grunt, the other for the message.

Lines 8000-8011

These subroutines will seldom be called so they are placed near the end. The noise-maker code was lifted from the old Apple II BASIC programming manual and just clicks the speaker a few times. The other subroutine prints the message.

Line 25

Finally, this line in the MAIN LOOP wipes the text clear when a new command is issued from the keyboard.

Watch for the continuing adventures of ROM in future issues of SoftSide:Apple Edition.

```
>LIST
    1  REM   *ROM THE ROBOT*
    2  REM    BILL SMITH
    3  REM    GAMBIER ISLAND
    4  REM    GIBSONS B.C.
    5  REM    CANADA
   10  GOTO 9000
   20  KEY= PEEK (-16384): IF KEY<
       128 THEN 60

   25  PRINT : PRINT : PRINT
   30  IF KEY#194 AND KEY#198 AND
       KEY#204 AND KEY#206 AND KEY#
```

```
      210 AND KEY#217 AND KEY#195
       AND KEY#196 AND KEY#205 AND
      KEY#200 AND KEY#209 THEN 50
  40  A=KEY
  50  POKE -16368,0
  60  GOSUB A*10
  70  POKE 60,0: POKE 61,4: POKE
      62,255: POKE 63,7: POKE 66,
      0: POKE 67,8: CALL -468
  80  POKE -16299,0: GR

  90  IF X<6 OR X>33 THEN 92: IF
      Y<5 OR Y>24 THEN 94: GOTO 20

  92  GOSUB 8010: GOSUB 8000: IF
      X<6 THEN X=X+1: IF X>33 THEN
      X=X-1:A=194: GOTO 20
  94  IF Y<5 THEN Y=Y+1: IF Y>24 THEN
      Y=Y-1: GOTO 20

 100  COLOR=4: REM  BODY (BU)
 110  VLIN Y+1,Y+7 AT X: VLIN Y+1
      ,Y+7 AT X-1: VLIN Y+1,Y+7 AT
      X+1
 120  RETURN
 200  COLOR=15: REM  HEAD FRONT(HF)
 210  PLOT X,Y: HLIN X-1,X+1 AT Y-
      1: PLOT X-2,Y-2: PLOT X-1,Y-
      2: PLOT X+1,Y-2: PLOT X+2,Y-
      2: PLOT X-2,Y-3: PLOT X,Y-3
      : PLOT X+2,Y-3
 220  HLIN X-1,X+1 AT Y-4
 230  RETURN
 250  COLOR=15: REM  EYES BLANK(HB)
 260  PLOT X,Y: HLIN X-1,X+1 AT Y-
      1: HLIN X-2,X-1 AT Y-2: HLIN
      X-2,X+2 AT Y-3: HLIN X-1,X+
      1 AT Y-4: HLIN X+1,X+2 AT Y-
      2
 270  RETURN
 300  COLOR=15: REM  HEAD FRONT LOOKIN
      G DOWN (HFD)
 310  HLIN X-1,X+1 AT Y: PLOT X-1
      ,Y-1: PLOT X+1,Y-1: PLOT X-
      2,Y-2: PLOT X,Y-2: PLOT X+2
      ,Y-2: HLIN X-1,X+1 AT Y-3: HLIN
      X-1,X+1 AT Y-4
 320  RETURN
 400  COLOR=15: REM  HEAD LEFT(HL)
 410  PLOT X,Y: HLIN X-1,X+1 AT Y-
      1: HLIN X-2,X+1 AT Y-2: PLOT
```

```
      X+1,Y-3: HLIN X,X+1 AT Y-4:
       PLOT X-1,Y-3
  420 RETURN
  500 COLOR=15: REM  HEAD FACING RIGHT
      (HR)
  510 PLOT X,Y: HLIN X-1,X+1 AT Y-
      1: HLIN X-1,X+2 AT Y-2: PLOT
      X-1,Y-3: HLIN X-1,X AT Y-4:
       PLOT X+1,Y-3
  520 RETURN
  900 COLOR=11: REM  LEG & ARMS FOR RI
      GHT FACE(LR)
  910 VLIN Y+8,Y+14 AT X: VLIN Y+
      1,Y+7 AT X: PLOT X+1,Y+14
  920 RETURN
  950 COLOR=11: REM  LEG & ARMS FOR LE
      FT FACE (LL)
  960 VLIN Y+8,Y+14 AT X: VLIN Y+
      1,Y+7 AT X: PLOT X-1,Y+14
  970 RETURN
 1000 COLOR=11: REM  LEGS AND ARMS FOR
       FRONT FACE (LF)
 1005 COLOR=11
 1010 PLOT X-2,Y+1: PLOT X+2,Y+1
 1015 VLIN Y+2,Y+7 AT X+3: VLIN Y+
      2,Y+7 AT X-3
 1020 VLIN Y+8,Y+14 AT X-1: VLIN
      Y+8,Y+14 AT X+1
 1050 RETURN

 1100 REM  LEGS & ARMS MARCH LEFT (LML
      )
 1110 COLOR=11
 1120 PLOT X,Y+1: PLOT X-1,Y+2: PLOT
      X-2,Y+3: PLOT X-3,Y+4: PLOT
      X-4,Y+5: PLOT X+2,Y+3
 1130 VLIN Y+8,Y+14 AT X: VLIN Y+
      10,Y+13 AT X-2: PLOT X-1,Y+
      9: PLOT X-3,Y+13: PLOT X-1,
      Y+14
 1140 RETURN
 1150 REM  LEG & ARMS MARCH LEFT 1 (LM
      L1)
 1160 COLOR=11
 1170 PLOT X,Y+1: PLOT X+1,Y+2: PLOT
      X+2,Y+3: PLOT X+1,Y+4: PLOT
      X,Y+5: PLOT X-2,Y+3: PLOT X-
      3,Y+4: PLOT X-4,Y+5
```

```
1180 VLIN Y+8,Y+14 AT X: PLOT X+
     1,Y+11: PLOT X-1,Y+14: PLOT
     X+1,Y+13: PLOT X+2,Y+12: PLOT
     X-1,Y+10
1190 RETURN
1200 REM  LEGS & ARMS MARCH RIGHT (LM
     R)
1210 COLOR=11
1220 PLOT X,Y+1: PLOT X+1,Y+2: PLOT
     X+2,Y+3: PLOT X+3,Y+4: PLOT
     X+4,Y+5: PLOT X-2,Y+3
1230 VLIN Y+8,Y+14 AT X: VLIN Y+
     10,Y+13 AT X+2: PLOT X+1,Y+
     9: PLOT X+3,Y+13: PLOT X+1,
     Y+14
1240 RETURN
1250 REM  LEG & ARMS MARCH RIGHT (LMR
     1)
1260 COLOR=11
1270 PLOT X,Y+1: PLOT X-1,Y+2: PLOT
     X-2,Y+3: PLOT X-1,Y+4: PLOT
     X,Y+5: PLOT X+2,Y+3: PLOT X+
     3,Y+4: PLOT X+4,Y+5
1280 VLIN Y+8,Y+14 AT X: PLOT X-
     1,Y+11: PLOT X+1,Y+14: PLOT
     X-1,Y+13: PLOT X-2,Y+12: PLOT
     X+1,Y+10
1290 RETURN

1940 D=0: REM  BLINK
1941 IF F>1 THEN F=0: GOSUB BU: GOSUB
     LF: IF F=0 THEN 1942: GOSUB
     HB:F=0: RETURN
1942 GOSUB HF:F=1: RETURN

1950 REM  CLIMB
1951 Y=Y-1: GOTO 2051
1960 REM  DESCEND
1961 Y=Y+1: GOTO 2051
1980 D=0: REM  FRONT FACE

1981 GOSUB HF: GOSUB BU: GOSUB LF:
     RETURN
```

```
2000 REM  HALT
2001 IF D=1 THEN A=210: IF D=2 THEN
     A=204: POP : GOTO 20
```

```
2040 D=2: REM  RIGHT FACE
```

```
2041 GOSUB HL: GOSUB BU: GOSUB LL:
      RETURN
```

```
2050 REM  FORWARD MARCH
2051 IF D=1 THEN 2052: IF D=2 THEN
     2055: POP :A=206: GOTO 20
2052 X=X+1: GOSUB HR: GOSUB BU: IF
     F=0 THEN 2053: IF F=2 THEN
     2054:F=F1: GOSUB LR: RETURN

2053 F=1:F1=2: GOSUB LMR: RETURN

2054 F=1:F1=0: GOSUB LMR1: RETURN

2055 X=X-1: GOSUB HL: GOSUB BU: IF
     F=0 THEN 2056: IF F=2 THEN
     2057:F=F1: GOSUB LL: RETURN

2056 F=1:F1=2: GOSUB LML: RETURN

2057 F=1:F1=0: GOSUB LML1: RETURN
```

```
2060 D=0: REM  SHAKE HEAD
```

```
2061 GOSUB BU: GOSUB LF: IF F=0 THEN
     2062: IF F=2 THEN 2063:F=F1:
      GOSUB HF: RETURN
2062 F=1:F1=2: GOSUB HL: RETURN

2063 F=1:F1=0: GOSUB HR: RETURN
```

```
2090 REM  QUIT ROUTINE
2092 POKE -16300,0: TEXT : CALL
     -936
2094 VTAB 10: TAB 18: PRINT "BYE!"

2096 POKE 75,8: POKE 205,8: END

2100 D=1: REM  LEFT FACE
```

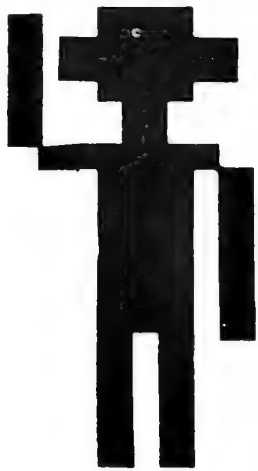
```
2101 GOSUB HR: GOSUB BU: GOSUB LR:
      RETURN
```

```
2170 D=0: REM  NOD
2171 IF F>1 THEN F=0: GOSUB BU: GOSUB
     LF: IF F=0 THEN 2172: GOSUB
     HF:F=0: RETURN
2172 GOSUB HD:F=1: RETURN

8000 REM  GRUNT SUBROUTINE
8002 FOR Z=1 TO 10:ZZ= PEEK (-16336
     ): FOR ZZ=1 TO 2: NEXT ZZ: NEXT
     Z: RETURN
8010 PRINT "OUCH! **** THAT HURT MY N
     OSE ****"
8011 RETURN

9000 REM  INITIALIZATION
9010 POKE 74,0: POKE 75,12
9020 POKE 204,0: POKE 205,12
9030 X=19:Y=19
9040 BU=100:HF=200:HD=300:HL=400
     :HR=500:HB=250:LR=900:LL=950
     :LF=1000
9041 LML=1100:LML1=1150:LMR=1200
     :LMR1=1250
9050 FOR A=20 TO 24: VTAB A: PRINT
     "
                ": NEXT A
9060 A=198: GR
9070 GOTO 20
9999 END
```

WATCH FOR FURTHER ADVENTURES WITH ROM THE ROBOT COMING NEXT MONTH!



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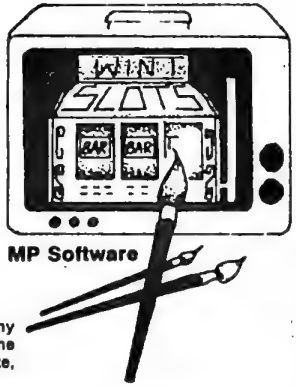

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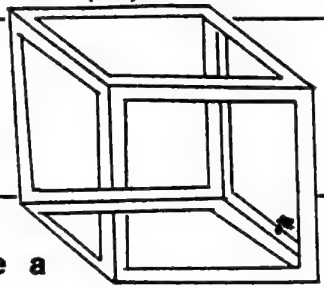

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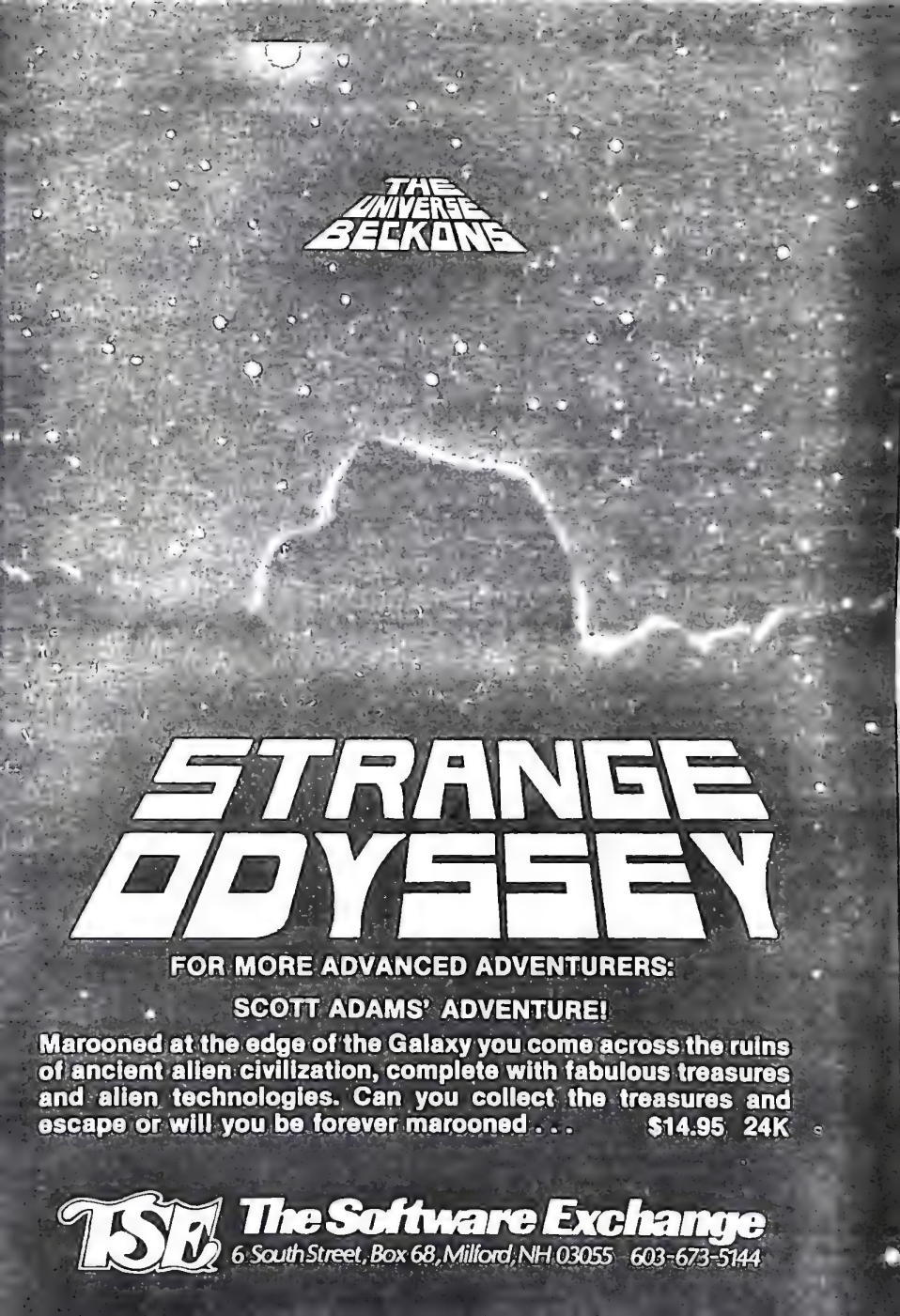
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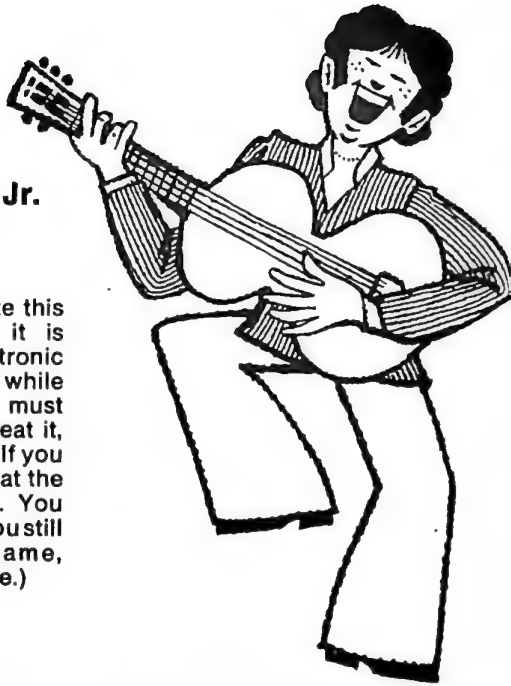
NO MIS

by Robert Hausman, Jr.



Most of you will recognize this program immediately, as it is based on a popular electronic game. No Mis plays a tune while flashing colored lights. You must remember the tune and repeat it, using the keys 1, 2, 3, and 4. If you are correct, No Mis will repeat the tune and add a new note. You continue until you miss. (If you still don't recognize the game, examine the program's name.)

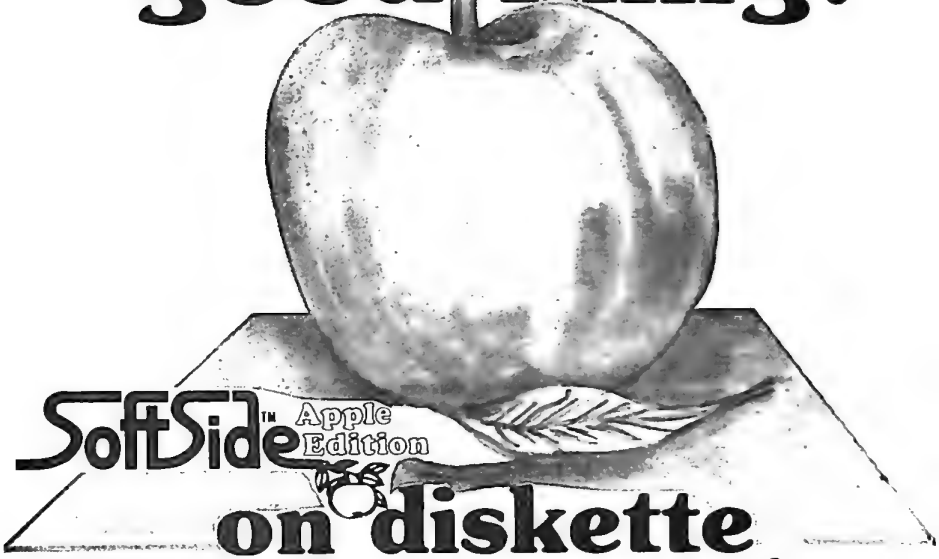
Integer BASIC

```
>LIST
  100 REM
  110 REM     ***    NO MIS    ***
  120 REM
  125 DIM A$(10)
  130 DIM C(4),F(4)
  133 JJ=600
  135 L=100
  140 TN=20
  150 DIM N(TN)
  160 TEXT
  170 CALL -936
  180 PRINT
  190 TAB 12
  195 PRINT "***    NO MIS    ***"
  200 PRINT
  210 PRINT
  350 PRINT
  360 PRINT "PLEASE HIT RETURN WHEN RE
      ADY";
  370 INPUT A$
 1000 GOSUB 32000
 1010 GR
 1020 FOR I=1 TO 24
```

```
1030 PRINT
1040 NEXT I
1050 PRINT "          1       2       3
          4"
1070 PRINT
1080 PRINT
1090 COLOR=15
1100 FOR I=1 TO 4
1110 FOR J=0 TO 4 STEP 4
1120 HLIN 7*I,4+7*I AT 27+J
1130 VLIN 28,30 AT 7*I+J
1160 NEXT J
1170 NEXT I
1180 C(1)=14
1190 C(2)=1
1200 C(3)=12
1210 C(4)=13
1220 F(1)=96
1230 F(2)=76
1240 F(3)=64
1250 F(4)=57
1255 REM  MAIN LOOP
1260 FOR I=1 TO TN
1270 N(I)=1+ RND (4)
1280 FOR J=1 TO I
1290 N=N(J)
1300 GOSUB 2000
1310 NEXT J
1320 FOR J=1 TO I
1330 GOSUB 3000
1340 GOSUB 2000
1350 IF N(J)<>N THEN 1400
1360 NEXT J
1362 FOR J=1 TO JJ
1364 NEXT J
1370 NEXT I
1380 PRINT "ALL HAIL LORD OF THE BEEP
     S !!!"
1385 PRINT ""      (CONTROL-G in quotes)
1390 GOTO 1600
1400 PRINT "ERROR! ERROR! ERROR!"
1405 PRINT ""      (CONTROL-G in quotes)
1410 PRINT "RATING (";I-1;"): ";
1420 IF I<4 THEN PRINT "DEAF AND BLIN
     D!"
1430 IF I=4 OR I=5 THEN PRINT "TIN EA
     R"
1440 IF I=6 OR I=7 THEN PRINT "TONE D
     EAF"
```

```
 1450 IF I=8 OR I=9 THEN PRINT "NEEDS
      PRACTICE"
 1460 IF I=10 OR I=11 THEN PRINT
      "YOU'VE DONE THIS BEFORE"
 1470 IF I=12 OR I=13 THEN PRINT
      "CLEARLY A MUSICIAN"
 1480 IF I>13 AND I<17 THEN PRINT
      "ELEPHANT'S MEMORY"
 1490 IF I>16 THEN PRINT "INCREDIBLE!!
      "
 1600 PRINT
 1605 POKE -16368,0
 1610 INPUT "ANOTHER GAME? ",A$
 1620 IF A$(1,1)="Y" THEN 1020
 1630 TEXT
 1640 CALL -936
 1650 END
 2000 COLOR=C(N)
 2010 GOSUB 2100
 2020 POKE 0,F(N)
 2030 POKE 1,L
 2040 CALL 2
 2050 COLOR=0
 2060 GOSUB 2100
 2070 RETURN
 2100 FOR X=-1 TO 1
 2110 HLIN 1+7*N,3+7*N AT 29+X
 2120 NEXT X
 2130 RETURN
 3000 N= PEEK (-16384)-176
 3010 IF N<1 OR N>4 THEN 3000
 3020 POKE -16368,0
 3030 RETURN
32000 POKE 2,173: POKE 3,48: POKE
      4,192: POKE 5,136: POKE 6,208
      : POKE 7,4: POKE 8,198: POKE
      9,1: POKE 10,240
32005 POKE 11,8: POKE 12,202: POKE
      13,208: POKE 14,246: POKE 15
      ,166: POKE 16,0: POKE 17,76
      : POKE 18,2: POKE 19,0: POKE
      20,96: RETURN
```

Get in on a good thing!



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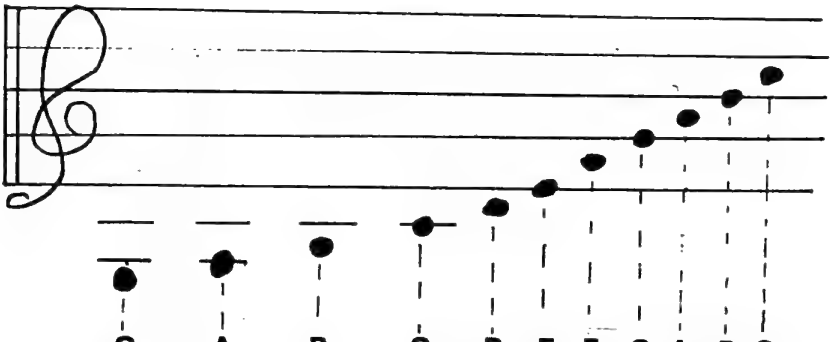
It's a Small World

from

Timothy B. Patrick and Ping H. Patrick

In the last issue we printed a little machine language subroutine that would produce tones through the Apple speaker. (A similar subroutine for Integer BASIC was printed in the February issue.) Well, when I arrived in Milford last week, I found a similar subroutine sent in from the Patricks with some added help: documentation for scales and durations, plus a song.

Pitch (P) values for the scale:



Duration (D) values for the note:

quarter note	half note	dotted half	full
60	120	180	255

D =

```
]LIST

10   REM  IT'S A SMALL WORLD
20   GOSUB 100
30   REM  P IS PITCH, D IS DURATIO
     N
40   READ P,D
50   IF P = 0 THEN 80
60   POKE 768,P: POKE 769,D: CALL
      770
70   GOTO 40
80   RESTORE : GOTO 20
90   REM  TONE SUBROUTINE
100   FOR L = 770 TO 790
110   READ V: POKE L,V
120   NEXT L
130   DATA  173,48,192,136,208,5,2
     06,1,3,240,9,202,208,245,174
     ,0,3,76,2,3,96
140   RETURN
150   REM  THE MUSIC
160   DATA  192,180,192,60,152,120
     ,192,120,171,180,171,60,171,
     255
170   DATA  171,180,171,60,144,120
     ,171,120,152,180,152,60,152,
     255
180   DATA  152,180,152,60,128,120
     ,152,120,144,180,144,60,144,
     120
190   DATA  152,60,171,60,255,180,
     144,60,152,120,171,120,192,2
     55
200   DATA  192,120,171,120,152,25
     5,171,120,192,120,228,255,17
     1,120,152,120,144,255
210   DATA  152,120,171,120,255,18
     0,144,60,152,120,171,120,192
     ,255,0,0
```

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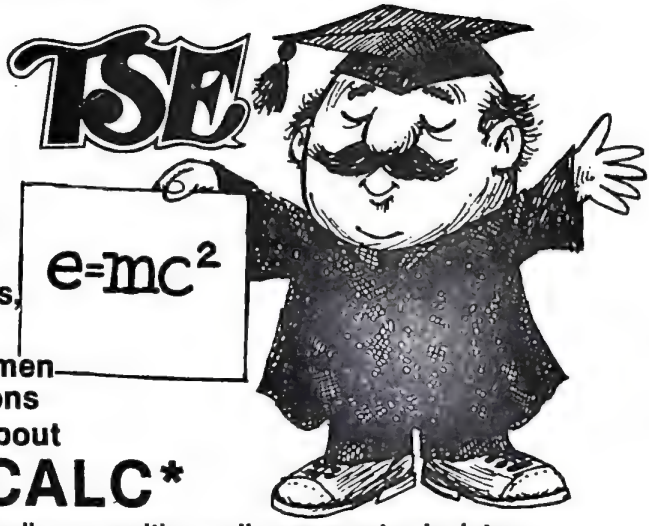

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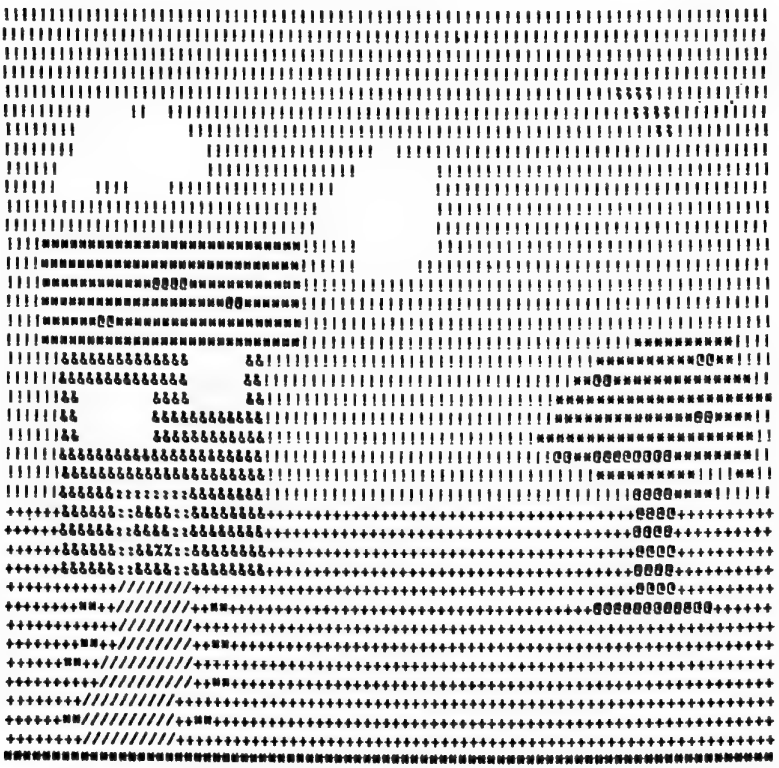
LO*RES PRINTOUT

by Scott Nevin



After many hours of trying to debug graphics programs without seeing the screen, I decided it was time to write a short routine to dump the lo-res screen onto a printer.

To operate the program, you must first run your program and put a picture on page 1 of the lo-res graphics screen; then typing a ctrl-C will cause a break in your program without damaging the lo-res picture. After a break is produced, simply 'RUN' the LO*RES PRINT OUT program and your picture will be dumped over to the printer.

I have included standard conversion characters in the program which closely simulate the colors by the characters' density (although the program allows the option of defining your own conversion characters to maybe highlight certain areas of the picture). You might notice on a sample run that two characters, such as !! or &&, constitute one dot

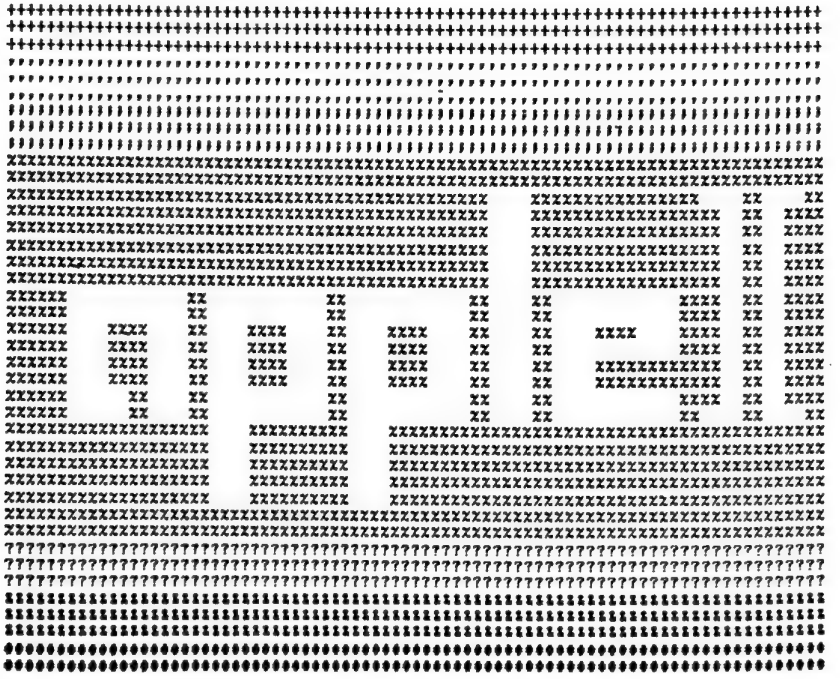
plotted. This is to equalize the offset of the printer, and to make your printout seem as square as the graphics screen.

One use my school has adopted for this program is providing a way for students to hand in printouts of their graphics programs, making teacher corrections and checking easier.

Note: To get the best results with your printer and interface card, you may have to try changing Line 120 to "120 NEXT" and/or changing Line 110 to "110 PRINT CH$;" —MP

```
5   REM   *SCOTT NEVIN
6   REM   *40320 FERGUSON
7   REM   *PLYMOUTH, MICH
8   REM   *              48170
9   REM   **PLYMOUTH CANTON HIGH**
10   INPUT "STANDARD COLORS ?";Y$
20   IF  LEFT$ (Y$,1) = "N" THEN 2
     30
30 CO$ = "": GOTO 210
35   REM GET PRINTER CARD SLOT#
40   INPUT "PRINTER SLOT ?";SLOT$
50   PRINT  CHR$ (4)"PR#"; VAL (SL
     OT$)
55   POKE 1785,132
60   PRINT : PRINT
65   REM   S%->SCREEN COLOR
66   REM   CO$->COLOR STRING
67   REM   CH$->ACTUAL SCREEN COLOR
69   REM GET LO-RES SCREEN
70   FOR I = 0 TO 39
80   FOR J = 0 TO 39
90  S% =  SCRN( J,I)
100  CH$ =  MID$ (CO$,S% + 1,1)
110   PRINT CH$;CH$;
120   NEXT : PRINT
130   NEXT
140   RESTORE
145   REM PRINT CHAR. CONVERT
150   FOR I = 1 TO 16
160   READ C$: PRINT C$;
170   FOR J = 1 TO 15 -  LEN (C$):
      PRINT ".";: NEXT
180   PRINT  MID$ (CO$,I,1)
190   NEXT
200   PRINT  CHR$ (4);"PR#0": END
205   REM GET STANDARD COLORS
210 CO$ = "#%&?*<!:@;<.+,/ "
220   GOTO 40
```

```
225   REM  GET USERS COLORS
230   FOR I = 0 TO 15
240   HOME
250   READ C$: PRINT C$" IS WHAT S
      YMBOL ->";: GET IC$: PRINT I
      C$:CO$ = CO$ + IC$
260   NEXT I
270   DATA   BLACK,MAGENTA,DARK BL
      UE,PURPL,DRK GREEN,GREY,MED
      BLUE,LT BLUE,BROWN,ORANGE,GR
      EY,PINK,GREEN,YELLOW,AQUA,WH
      ITE
280   GOTO 40
```



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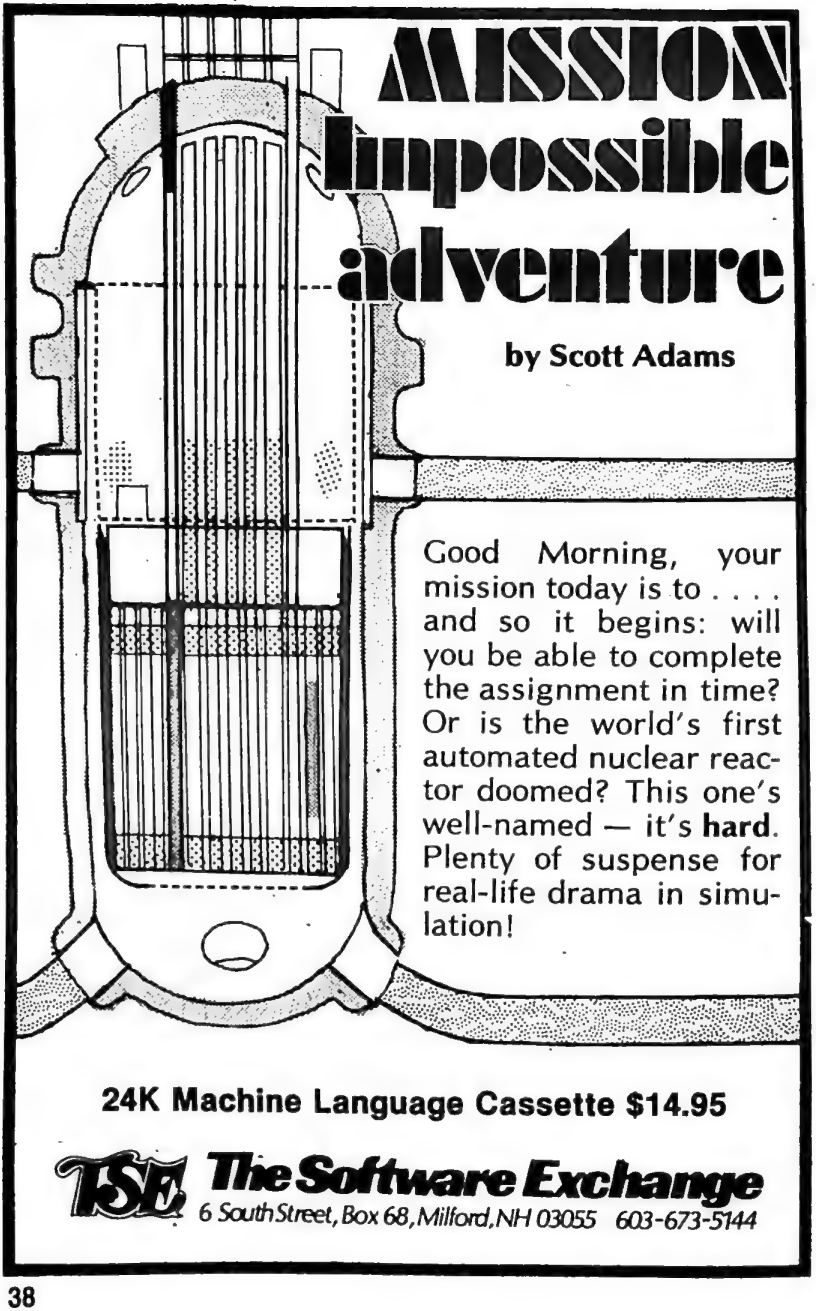

MISSION impossible adventure

by Scott Adams

Good Morning, your mission today is to . . . . and so it begins: will you be able to complete the assignment in time? Or is the world's first automated nuclear reactor doomed? This one's well-named — it's **hard**. Plenty of suspense for real-life drama in simulation!

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PORK BARREL

by George Blank

Translated for Apple II by Murray Summers

NO HELP WANTED!

Great job, lots of prestige, private gymnasium, subsidized television studio, large staff allowance (hire the whole family!), good salary, free travel to exotic locations at your desire, total perquisites approximately $4,000,000 per year. Newcomers need not appy.

This game lets you start with the above described job, as a member of the United States Congress. The object of the game is the same as the favorite game of every other member of congress; re-election. Are you able to vote your conscience, satisfy the voters, placate the lobbyists, resist the demands of the White House, and manage your campaign funds well enough to keep your job?

The game proceeds by years. As a member of the House of Representatives you have two years between elections. In each year, you will be given research data on your district, you will vote on appropriation requests, and you will vote on five bills of record. At the end of two years, you may allocate any campaign funds contributed by lobbyists for your campaign advertising.

Immediately after your initial election, your research staff gives you a breakdown of your district, characterizing each precinct by the predominant occupation of the wage earners living there. A census of each precinct's voters will help you determine the relative strength of each group in your district. If you have only a few farmers and a lot of people who are unemployed, you might not want to vote against a bill to hold down the price of food!

After your glance at the statistics of your constituency, you must attend the budget hearings for the current year. Every department always wants more, more, more. You get to help decide how much they get. Do you want billions more for defense, more for human services, or will you try to hold down inflation by limiting the growth of the budget. Did you, in the notorious tradition of Senator Phogbound, promise more services and lower taxes in the last election?

After the budget hearing, you have to vote publicly on five bills, with the president twisting your arm, the various lobbies flashing their bankrolls before your ideas, and your hometown newspaper telling the voters what you did and what the editor thinks about it. Before you vote, you are given the results of opinion polls from your research staff, the positions of the lobbies, (with occasional subtle hints $$$), and the position of the President. You may vote Yes or No, or avoid taking a position by voting Absent.

After five bills have been considered, the year is over. If it is the end of the first year of your current term, you are given another profile of your constituency, you attend more budget hearings, and vote on more bills. At the end of the second session of the current congress, it is campaign time.

During the campaign, you must spend your campaign funds where you think they will do you the most good. You can choose between 3 TV shows, 2 radio stations, 2 newspapers, a union magazine, billboards, and handbills. Each medium reaches a different constituency, but the constituencies overlap. By the time you have spent 40 years in Congress, you should have a fine appreciation for the relative strengths of the different media. You can save some of your money for a future election, but your credit is no good. If you can't pay, you cannot advertise.

After you allocate your campaign funds, the excitement of election night is upon you. The results come in by precinct, and then they are announced. Results are determined for each precinct individually, taking into consideration your votes on different bills and the effectiveness of your advertising in reaching that group. The real challenge of the game is not necessarily to win re-election, as there are some crass methods of doing that. Perhaps the easiest is simply to allow public opinion to determine your votes and spend your campaign funds broadly among the different categories. The real test is your ability to vote the way you want and still manage to win re-election.

The game is designed for social interaction, and it is intended to stimulate discussion of political topics. Up to four persons can play at one time. If you have memory to spare in your computer and want to customize the program, I would suggest staggering the election results by precinct and giving interim reports of the various races.

Line 1750 contains a very important variable, A(A). This is the percent of the vote that you start with in all calculations. If you want to make the game harder, set A(A) below 37. If you want to make re-election easier, set A(A) above 37.

Now, get out there and start kissing babies!

```
]LIST
 1  GOTO 370: REM  .04/24/80.
 2 NA$ = "PORK BARREL": RETURN : REM
10  REM **************************
        **************************
        **                      **
        **   PORK BARREL        **
        **   WRITTEN BY         **
        **   GEORGE BLANK       **
11  REM **                      **
        **   TRANSLATED FOR     **
        **   APPLE ][ AND       **
        **   SOFTSIDE (APPLE)   **
        **   BY==============   **
        **                      **
12  REM **   MURRAY SUMMERS     **
        **   SPRINGFIELD, PA    **
        **                      **
        **************************
```

KEYBOARD READ

```
80  WAIT  - 16384,128: POKE  - 16
    368,0:KB$ =  CHR$ ( PEEK ( -
    16384)): RETURN
```

The "WAIT -16384, 128" will simply delay until a key with ASCII value greater than 127 is pressed, at which point the routine continues by re-setting the key-board strobe with a "POKE -16368,0."

TITLE FORMAT

```
140  PRINT  SPC( (40 -  LEN (A$))
     / 2)A$: PRINT : RETURN
```

BILL FORMAT

```
160  FOR I =  LEN (B1$(B)) TO 1 STEP
     - 1: IF  MID$ (B1$(B),I,1) =
     " " THEN B2$ =  RIGHT$ (B1$(
     B), LEN (B1$(B)) - I) + B2$:
     B1$(B) =  LEFT$ (B1$(B),I -
     1): GOTO 210
```

> We are looking for the rightmost space to locate a break-point for the line.

```
200  NEXT
210  IF  LEN (B1$(B)) < 40 THEN  RETURN
220 B2$ = " " + B2$: GOTO 160
```

> On exit, B1$(B) will contain the first line and B2$ will contain the second line of the bill description.

MAIN LISTING

Randomizer function

```
370  DEF  FN R(X) =  INT ( RND (1
     ) * X) + 1
380 X =  RND ( RND (9))
```

> The "RND (RND(9))" is used to "SEED" the random number generator.

```
420  TEXT : HOME : VTAB 10: HTAB
     8: PRINT "PORK BARREL"
430 LL$ = "----------------------
     ----------------"
```

```
440   FOR I = 1 TO  FN R(50):A =  FN
      R(1): NEXT :A = 0
450   DIM AD(4,10),V(20,11),P(11),
      C(4,16),B(4,5),D(4,10),E(4,1
      0),F(4,10),W(20),M(4,2),L$(1
      1),LF$(12)
460   DIM V$(20),A(4)
470   FOR A = 0 TO 11: READ L$(A):
       NEXT
480   FOR A = 1 TO 4: READ B$(A): NEXT
490   FOR A = 1 TO 20: READ V$(A):
       NEXT
500   FOR A = 1 TO 20: FOR B = 0 TO
      11: READ V(A,B): NEXT B,A
510   FOR A = 1 TO 11: READ P(A): NEXT
544   FOR A = 1 TO 4: READ B(0,A):
       NEXT
530   FOR A = 1 TO 20: READ W(A): NEXT
540   FOR A = 1 TO 10: READ A$(A):
       NEXT
550   FOR A = 1 TO 4: READ O$(A): NEXT
560   FOR A = 1 TO 10: READ D$(A):
       NEXT
570 YR = 1980:B$ = "THE HONORABLE
      ":C$ = ", M.C."
580   PRINT : PRINT "THE GAME THAT
       CONGRESSPEOPLE NEVER STOP P
      LAYING : RE-ELECTION"
590   PRINT : PRINT
600   PRINT "HOW MANY EAGER CANDID
      ATES WISH TO BEGIN THEIR CAR
      EER IN THE UNITED STATES
         CONGRESS (1 TO 4) ? ";: GOSUB
       80
610 P =  VAL (KB$): PRINT P
```

ROM THE ROBOT

RUNS FOR CONGRESS

Even though numeric input is expected, it is good practice to input a string and then convert to a number with the "VAL(" function. This also allows the user to simply hit the "RETURN" key without getting a "***SYNTAX ERR!"

```
670   IF P < 1 THEN P = 1
680   IF P > 4 THEN P = 4
690   DIM A%(P,10),PO(P,10)
700   FOR A = 1 TO P
710   HOME : VTAB 5: PRINT "WHO IS
       THE CANDIDATE FROM DISTRICT
            NUMBER ";A
720   PRINT  CHR$ (7)"* PLEASE TYP
      E YOUR FIRST AND LAST NAME *
      ";: INVERSE : PRINT "       .
      ..................<<<STOP>>>"
      ;:N$ =  CHR$ (8): FOR I = 1 TO
      34: PRINT N$;: NEXT : NORMAL
      : INPUT "";N$(A): PRINT
```

CHR$(8) is a back-space. This is one way of moving the cursor back.

FIND FIRST & LAST NAME

```
770   FOR I = 1 TO  LEN (N$(A)): IF
       MID$ (N$(A),I,1) = " " THEN
      LN$(A) =  RIGHT$ (N$(A), LEN
      (N$(A)) - I):I =  LEN (N$(A)
      )
```

Whenever hopping out of a FOR-NEXT loop prematurely, it is a good idea to close the loop.. in this case by the statement : I = LEN (N$(A)). By doing this, intricately nested loops will always terminate correctly

```
830   NEXT
840   IF LN$(A) = "" THEN LN$(A) =
      N$(A)
850   NEXT
```

```
860   HOME
870   FOR I = 1024 TO 1063: POKE I
      ,32: POKE I + 128,32: POKE I
      + 256,32: NEXT
```

This sequence of pokes is simply putting inverse spaces along the top three lines of the screen fast!

```
920   VTAB 2
930   INVERSE : PRINT "     === EL
      ECTION RESULTS "YR" ==="
940   FOR I = 1280 TO 1319: POKE I
      ,43: NEXT : NORMAL
```

"POKE I,43" puts an inverse pound sign across the banner.

```
990   PRINT : FOR A = 1 TO P
1000   PRINT "      CONGRESSIONAL
      DISTRICT - ";A
1010  A$ = B$ + N$(A): GOSUB 140
1020   NEXT
1030   PRINT "          NEW REPRESE
      NTATIVES"
1040   FOR A = 1 TO P
1050  D(A,1) = 10000:D(A,2) = 3000
      0:D(A,3) = 60000:D(A,4) = 25
      000
1060  D(A,5) = 50000:D(A,6) = 5000
      0:D(A,7) = 15000:D(A,8) = 40
      000
1070  D(A,9) = 20000:D(A,10) = 400
      00:T(A,0) = 60:D(A,0) = 3400
      00
1080   NEXT
1090   GOSUB 1460
```

Screen FOOTER.

```
1120   FOR A = 1 TO P
1130   GOSUB 1490
```

District summary.

```
 1160  NEXT
 1170  GOSUB 3010
```

Budget hearings.

```
 1200  GOSUB 4010
```

Roll call voting.

```
 1230  GOSUB 1740
```

Repopulate the districts.

```
 1260 YR = YR + 1
 1270  FOR A = 1 TO P
 1280  GOSUB 1490
```

District summary.

```
 1310  NEXT
 1320  GOSUB 3010
 1330  GOSUB 4010
 1340  FOR A = 1 TO P: GOSUB 5020:
       NEXT
```

Advertising.

```
 1370  GOSUB 9010
```

Election.

```
 1400  GOSUB 1740
 1410 YR = YR + 1
 1420  GOTO 1120
```

And start all over again.

SCREEN FOOTER

```
 1460  VTAB 24: HTAB 7: INVERSE : PRINT
       " HIT ANY KEY TO CONTINUE ";
       : NORMAL : GOSUB 80
 1470  RETURN
```

DISTRICT SUMMARY

```
 1490  HOME : PRINT "     CONGRESSI
       ONAL DISTRICT "A", "YR
 1500  PRINT
```

```
1510 A$ = B$ + N$(A) + C$: GOSUB
     140
1520  FOR I = 1082 TO 1102: POKE
     I + 728,32: POKE I + 856,32:
      POKE I,32: POKE I + 128,32:
      POKE I + 256,32: POKE I + 3
     84,32: POKE I + 512,32: POKE
     I + 640,32: POKE I + 768,32:
      POKE I + 896,32: POKE I + 4
     0,32: POKE I + 168,32: POKE
     I + 296,32: POKE I + 424,32:
      NEXT
```

This sequence of pokes makes the background of the bar graph appear in inverse, for better visibility. Notice that the background fills from top to bottom when the program is run, even though the pokes appear out of order. This is because of the way APPLE maps its memory.

```
1590  PRINT  TAB( 8)D(A,0)" REGIS
     TERED VOTERS": PRINT : INVERSE
     : HTAB (19): PRINT "  %%%% C
     HANGE  %%%%  "
1600  HTAB 19: PRINT "    -5%
        +5%"
1610  HTAB 19: PRINT "!....!....+
     ....!....!"
1620  POKE 32,28: POKE 33,1: PRINT
     : VTAB 10: FOR I = 1 TO 10: PRINT
     "!";: NEXT : TEXT
1630  NORMAL : VTAB 10
1640  FOR B = 1 TO 10: PRINT D$(B
     ); TAB( 18 -  LEN ( STR$ (D(
     A,B))));D(A,B): NEXT
```

```
1650  FOR J = I TO 10:PD =  SGN (
      PO(A,J)): IF PD =  - 1 THEN
       INVERSE
1660  IF  ABS (PO(A,J)) > 10 THEN
      FLASH
1670  VTAB 9 + J: HTAB 29 +  INT
      (PO(A,J)) * ( ABS (PO(A,J)) <
      10) + 10 * ( ABS (PO(A,J)) >
      10): PRINT "*": NORMAL
1680  NEXT : TEXT : VTAB 20: INVERSE
      :
1690  HTAB 19: PRINT "!....!....+
      ....!....!": NORMAL
1700  VTAB 22: PRINT "      UNEMP
      LOYMENT RATE "; INT ((D(A,9)
       + D(A,10) / 5) / D(A,0) * 1
      0000) / 100;" %"
1710  GOSUB 1460
1720  RETURN
```

REPOPULATION

```
1740  FOR A = 1 TO P
1750  PO(A,1) = D(A,1):D(A,1) = D(
      A,1) +  FN R(1000) - 400:A(A
      ) = 37
1760  PO(A,2) = D(A,2):D(A,2) = D(
      A,2) +  FN R(3000) - 1000
1770  PO(A,3) = D(A,3):D(A,3) = D(
      A,3) +  FN R(5000) - 2200
1780  PO(A,4) = D(A,4):D(A,4) = D(
      A,4) +  FN R(500) - 250
1790  PO(A,5) = D(A,5):D(A,5) = D(
      A,5) +  FN R(5000) - 3000
1800  PO(A,6) = D(A,6):D(A,6) = D(
      A,6) +  FN R(3000) - 1000
1810  PO(A,7) = D(A,7):D(A,7) = D(
      A,7) +  FN R(600) - 500
1820  PO(A,8) = D(A,8):D(A,8) = D(
      A,8) +  FN R(2000) - 500
1830  PO(A,9) = D(A,9):D(A,9) = D(
      A,9) +  FN R(800) - 400
1840  PO(A,10) = D(A,10):D(A,10) =
      D(A,10) +  FN R(1000) - 400
1850  FOR J = 1 TO 10:PO(A,J) = (
      (D(A,J) - PO(A,J)) / D(A,J))
       * 100: NEXT
1860  D(A,0) = 0
1870  FOR I = 1 TO 10:D(A,0) = D(
      A,0) + D(A,I): NEXT I
1880  : NEXT A
1890  FOR B = 1 TO P
```

```
1900  FOR C = 1 TO 4
1910 B(0,C) = B(0,C) + B(B,C)
1920  NEXT C,B
1930  FOR B = 1 TO 4
1940 B(0,B) = B(0,B) / (1 + P)
1950  NEXT B
1960  RETURN
```

BUDGET HEARINGS

```
3010  HOME
3020  FOR I = 1024 TO 1063: POKE
      I,36: POKE I + 128,36: POKE
      I + 256,32: NEXT
3030  VTAB 3: HTAB 10: INVERSE : PRINT
      "$$ BUDGET HEARINGS $$": NORMAL
3040  PRINT LL$
3050  POKE 34,5
3060  FOR B = 1 TO 4
3070 B1$(B) = "DEPARTMENT OF " +
      B$(B)
3080  IF  LEN (B1$(B)) > 39 THEN
      GOSUB 160
3090  PRINT : PRINT B1$(B): PRINT
      B2$
3100 B2$ = ""
3110  PRINT YR - 1" BUDGET"; TAB(
      26);YR" REQUEST"
3120 B(0,B) =  INT (100 * B(0,B) +
      .5) / 100
3130  PRINT "$";B(0,B);" BILLION"
      ; TAB( 26)"$" INT (B(0,B) *
      120 + .5) / 100" BILLION"
3140  FOR A = 1 TO P
3150  PRINT : PRINT B$N$(A)C$
3160 B(A,B) = 1.1 * B(0,B)
3170  INPUT "HOW MANY BILLION $ W
      ILL YOU VOTE FOR ?  ------ "
      ;I$
3180 B(A,B) =  VAL (I$):I$ = ""
3190  IF B(A,B) < (.9 * B(0,B)) THEN
      B(A,B) = .9 * B(0,B)
3200  IF B(A,B) > (B(0,B) * 1.2) THEN
      B(A,B) = (B(0,B) * 1.2)
3210 PC(A) = (B(A,B) - B(0,B) *
      9) * 5: IF PC(A) < 0 THEN PC
      (A) = 0
3220  NEXT A: HOME : NEXT B
3230  FOR A = 0 TO P: FOR B = 1 TO
      4:B(A,5) = B(A,5) + B(A,B): NEXT
      B,A
3240  POKE 34,0
```

```
3250  RETURN
```

ROLL CALL VOTING

```
4010  HOME : HTAB 5: INVERSE : PRINT
      "U.S. HOUSE OF REPRESENTATIV
      ES"
4020  HTAB 12: PRINT "ROLL CALL V
      OTING": NORMAL
4030  H(1) =  FN R(20):H(2) =  FN
      R(20): IF H(2) = H(1) THEN 4
      030
4040  H(3) =  FN R(20): IF H(3) =
      H(2) OR H(3) = H(1) THEN 404
      0
4050  H(4) =  FN R(20): IF H(4) =
      H(3) OR H(4) = H(2) OR H(4) =
      H(1) THEN 4050
4060  H(5) =  FN R(20): IF H(5) =
      H(4) OR H(5) = H(3) OR H(5) =
      H(2) OR H(5) = H(1) THEN 406
      0
4070  FOR B = 1 TO 5:X = H(B):O(1
      ) = V(X,0) +  FN R(5):O(2) =
      3 +  FN R(18):O(3) = 100 - O
      (1) - O(2)
4080  HTAB 7: PRINT "HOUSE BILL N
      UMBER "B" - "YR
4090  B1$(B) = "A BILL " + V$(X): IF
       LEN (B1$(B)) > 39 THEN  GOSUB
      160
4100  PRINT
4110  PRINT  SPC( (40 -  LEN (B1$
      (B))) / 2);: PRINT B1$(B)
4120  IF B2$ <  > "" THEN  PRINT
       SPC( (40 -  LEN (B2$)) / 2)
      ;: PRINT B2$
4130  POKE 34, PEEK (37): PRINT
4140  IF W(X) = 1 THEN  PRINT "TH
      E PRESIDENT WANTS YOU TO VOT
      E FOR THISONE"
4150  IF W(X) = 2 THEN  HTAB 3: PRINT
      "THE WHITE HOUSE OPPOSES THI
      S BILL"
4160  PRINT
4170  HTAB 4: PRINT "** LATEST PU
      BLIC OPINION POLL **"
4180  PRINT "UNDECIDED    FAVOR B
      ILL     OPPOSE BILL ========
      =    ==========     ========
      ==="
```

```
4190  HTAB 4: PRINT O(2)" %";: HTAB
      19: PRINT O(1)" %";: HTAB 34
      : PRINT O(3)" %"
4200  GOSUB 6010
```

Align lobbies.

```
4230  FOR C = 0 TO 11: IF LF$(C) <
      > "" THEN  PRINT LF$(C)
4240  NEXT C
4250  GOSUB 1460
4260  HOME : PRINT : PRINT
4270  HTAB 15: PRINT "V O T I N G
      "
4280  PRINT "    YES  NO  OR  ABS
      ENT (Y, N OR A) "
4290  PRINT
4300  FOR A = 1 TO P
4310  PRINT B$N$(A): PRINT "
      YOUR VOTE : ";
4320  GOSUB 80: IF KB$ <  > "Y" AND
      KB$ <  > "N" AND KB$ <  > "A
      " THEN  PRINT  CHR$ (7) CHR$
      (7) CHR$ (7);: GOTO 4320
4340  PRINT
```

Go get money for the till.

```
4350  GOSUB 7710:M(A,1) = 0:M(A,2
      ) = 0
4360  NEXT A
4370  HOME : PRINT : PRINT
4380 N(1) = N(1) * 11 + 100 +  FN
      R(120)
4390 N(2) = N(2) * 11 + 100 +  FN
      R(120)
4400  PRINT : PRINT
4410  PRINT "RESULTS OF VOTE:
      YEAS-"N(1)"   NEAS-"N(2)
4420  PRINT : PRINT
4430  INVERSE
4440  IF N(1) > N(2) THEN  HTAB 1
      2: PRINT "THE BILL PASSES": GOTO
      4460
4450  HTAB 10: PRINT "THE BILL IS
      DEFEATED"
4460  NORMAL
4470 N(1) = 0:N(2) = 0: GOSUB 146
      0: HOME
4480 B2$ = ""
```

```
4490 T = T + 1
4500  POKE 34,2: HOME
4510  NEXT B
4520  TEXT
4530  RETURN
```

ADVERTISING

```
5020  FOR I = 1 TO P: FOR J = 1 TO
      10:A%(I,J) = 0: NEXT J,I
5030  TEXT : HOME : PRINT
5040  PRINT B$N$(A): PRINT "ADVER
      TISING      CAMPAIGN FUND: $"
      C(A,15)
5050  FOR I = 1536 TO 1575: POKE
      I,36: NEXT : VTAB 7
5060  HTAB (3): PRINT "===TELEVIS
      ION SPOTS (PER MIN.)==TOTAL"
      :TL =  PEEK (37) + 1
5070  PRINT "   SOAP OPERA.....
      .........$ 500          EVENI
      NG NEWS.............$1000
            PRIME TIME.........
      ....$2000"
5080  HTAB (3): PRINT "===RADIO S
      POTS":L1 =  PEEK (37)
5090  PRINT "   TOP 40 HITS.....
      .........$  25          ALL N
      EWS.................$  15"
5100  HTAB (3): PRINT "===DAILY N
      EWSPAPERS (PER PAGE)":L2 =  PEEK
      (37)
5110  PRINT "   DAILY SCANDAL....
      .........$ 100          MORNI
      NG JOURNAL..........$  50"
5120  HTAB (3): PRINT "===OTHER M
      EDIA":L3 =  PEEK (37)
5130  PRINT "   MILLWORKERS NEWSL
      ETTER...$ 200          BILLB
      OARDS (EACH).......$ 500
            HANDBILLS (PER 1000).
      ....$  10":BL =  PEEK (37)
5140 J = 1: FOR I = TL TO BL: VTAB
      I: IF (I <  > L1 AND I <  >
      L2 AND I <  > L3) THEN IN =
      1: HTAB 39 -  LEN ( STR$ (A%
      (A,J))): PRINT A%(A,J)
5150  PRINT : IF IN = 1 THEN J =
      J + 1:IN = 0
5160  NEXT
```

```
5170  VTAB 23: INVERSE : PRINT "*
      * LEFT/RIGHT ARROWS & RETURN
       SELECTS. ": PRINT "**  " CHR$
      (34)"ESC" CHR$ (34)" KEY TO
      CONTINUE.                  ";: GOSUB
      30020
5180  HOME : PRINT : INVERSE : PRINT
      "A D V E R T I S I N G    C A
       M P A I G N": NORMAL
5190  PRINT : PRINT "CAMPAIGN FUN
      D   $"C(A,15)
5200  PRINT : PRINT "        HOW M
      UCH DO YOU WANT TO SPEND
      ADVERTISING ";
5210  PRINT A$(I)"?"
5220  PRINT : INPUT "AMOUNT : $";
      X$:X =  VAL (X$)
5230  IF X > C(A,15) THEN  PRINT
      "SORRY, YOUR CREDIT IS NO GO
      OD!": GOTO 5220
5240  IF X < 1 THEN 5280
5250  A%(A,I) = A%(A,I) + X
5260  ON I GOSUB 5290,5320,5330,5
      340,5350,5360,5370,5380,5390
      ,5400
5270  C(A,15) = C(A,15) - X
5280  GOTO 5030
5290  Z = X / 1000:AD(A,5) = AD(A,
      5) + Z / 5:AD(A,6) = AD(A,6)
       + Z / 4:AD(A,9) = AD(A,9) +
      Z / 2:AD(A,10) = AD(A,10) +
      Z: RETURN
5300  FOR X = 1 TO 10:AD(A,X) =  INT
      (AD(A,X)): IF AD(A,X) > 12 THEN
      AD(A,X) = 12
5310  NEXT : RETURN
5320  Z = X / 1000:AD(A,1) = AD(A,
      1) + Z:AD(A,4) = AD(A,4) + Z
      / 3:AD(A,7) = AD(A,7) + Z /
      5: RETURN
5330  Z = X / 1000:AD(A,2) = AD(A,
      2) + Z:AD(A,3) = AD(A,3) + Z
      :AD(A,6) = AD(A,6) + Z:AD(A,
      8) = AD(A,8) + Z:AD(A,10) =
      AD(A,10) + Z / 2: RETURN
5340  Z = X / 250:AD(A,5) = AD(A,5
      ) + Z / 5:AD(A,6) = AD(A,6) +
      Z / 4:AD(A,9) = AD(A,9) + Z /
      2: RETURN
5350  Z = X / 150:AD(A,1) = AD(A,1
      ) + Z / 3:AD(A,2) = AD(A,2) +
      Z / 2:: RETURN
```

```
5360 Z = X / 500:AD(A,3) = AD(A,3
     ) + Z:AD(A,5) = AD(A,5) + Z:
     AD(A,8) = AD(A,8) + Z: RETURN

5370 Z = X / 500:AD(A,1) = AD(A,1
     ) + Z / 2:AD(A,2) = AD(A,2) +
     Z / 3:AD(A,8) = AD(A,8) + Z /
     4: RETURN
5380 Z = X / 1000:AD(A,5) = AD(A,
     5) + Z:AD(A,9) = AD(A,9) + Z
     / 5: RETURN
5390 Z = X / 1000:AD(A,4) = AD(A,
     4) + Z / 3:AD(A,5) = AD(A,5)
      + Z / 2:AD(A,6) = AD(A,6) +
     Z / 4: RETURN
5400 Z = X / 4000: FOR Y = 1 TO 1
     0:AD(A,Y) = AD(A,Y) + Z: NEXT
     : RETURN
```

LOBBIES

```
6010  PRINT : INVERSE : PRINT " L
     OBBIES ";: NORMAL
6020  HTAB 17: PRINT " FAVOR
        OPPOSE"
6030  FOR C = 1 TO 11
6040  IF V(X,C) > 0 THEN  GOSUB 6
     090
6050  IF V(X,C) = 0 THEN LF$(C) =
     "": GOTO 6070
6060  IF ((V(X,C) < 3 OR V(X,C) >
     7) AND P(C) > 0) THEN  GOSUB
     20020
6070  NEXT
6080  RETURN
6090  ON V(X,C) GOTO 6100,6110,61
     20,6140,6140,6140,6170,6160,
     6150
6100 LF$(C) = L$(C) + "
            +++": GOTO 6130
6110 LF$(C) = L$(C) + "
              ++": GOTO 6130
6120 LF$(C) = L$(C) + "
                +": GOTO 6130
6130  IF V(X,C) < 3 THEN  FOR A =
     1 TO P:M(A,2) = M(A,2) + (4 -
     V(X,C)) * P(C): NEXT A
6140  RETURN
6150 LF$(C) = L$(C) + "  +++": GOTO
     6180
6160 LF$(C) = L$(C) + "   ++": GOTO
     6180
```

```
6170 LF$(C) = L$(C) + "     +": GOTO
     6180
6180  IF V(X,C) > 7 THEN  FOR A =
     1 TO P:M(A,1) = M(A,1) + (V(
     X,C) - 6) * P(C): NEXT A
6190  RETURN
```

FILL COFFERS

```
7710  IF KB$ = "Y" THEN 7740
7720  IF KB$ = "N" THEN 7840
7730  RETURN
7740 N(1) = N(1) + 1
7750  FOR E = 1 TO 11
7760  IF V(X,E) = 0 THEN 7780
7770 Z = V(X,E) - 5:C(A,E) = C(A,
     E) + Z
7780  NEXT
7790 C(A,15) = C(A,15) + M(A,1) *
     98:C(A,0) = C(A,0) + O(1) -
     O(3)
7800 C(A,14) = C(A,14) + 1: IF V(
     X,6) > 5 THEN C(A,13) = C(A,
     13) + 1
7810  IF V(X,7) > 5 THEN C(A,12) =
     C(A,12) + 1
7820  IF W(X) = 1 THEN C(A,16) =
     C(A,16) + 1
7830  IF W(X) = 2 THEN C(A,16) =
     C(A,16) + 1
7840 N(2) = N(2) + 1
7850  FOR E = 1 TO 11
7860  IF V(X,E) = 0 THEN 7880
7870 Z = V(X,E) - 5:C(A,E) = C(A,
     E) - Z
7880  NEXT
7890 C(A,15) = C(A,15) + M(A,2) *
     87:C(A,0) = C(A,0) + O(3) -
     O(1)
7900 C(A,14) = C(A,14) + 1: IF V(
     X,6) < 5 THEN C(A,13) = C(A,
     13) + 1
7910  IF V(X,7) < 5 THEN C(A,12) =
     C(A,12) + 1
7920  RETURN
```

ROUNDING OFF

```
8810  IF X < 32767 THEN 8860
8820  IF X < 327670 THEN X = X /
     10: GOTO 8870
```

```
8830  IF X < 3276700 THEN X = X /
      100: GOTO 8880
8840  IF X < 32767000 THEN X = X /
      1000: GOTO 8890
8850  RETURN
8860 X =  INT (X): RETURN
8870 X =  INT (X):X = X * 10: RETURN
8880 X =  INT (X):X = X * 100: RETURN
8890 X =  INT (X):X = X * 1000: RETURN
```

ELECTION

```
9010  FOR A = 1 TO P: FOR B = 0 TO
      11
9020  IF C(A,B) > 22 THEN C(A,B) =
      22
9030  IF C(A,B) < (1 - 23) THEN C
      (A,B) = (1 - 23)
9040  NEXT B,A
9050  FOR A = 1 TO P
9060  HOME : INVERSE : HTAB 4: PRINT
      "  E L E C T I O N     R E S U
      L T S ": NORMAL
9070  FOR I = 1152 TO 1191: POKE
      I,35: NEXT : VTAB 3
9080  PRINT "DISTRICT ";A: PRINT
      "PCT   "O$(A)"    "LN$(A)
9090 Z = (C(A,0) + 4 * C(A,7) + 3
      * C(A,6) + 2 * C(A,2)) / 10
9100 X = (Z + A(A) + AD(A,1)) / 1
      00 * D(A,1): GOSUB 8810:E(A,
      1) = X
9110 Z = (2 * C(A,0) + C(A,7) + 2
      * C(A,6) + 2 * C(A,5) + 3 *
      C(A,2)) / 10
9120 X = (Z + A(A) + AD(A,2)) / 1
      00 * D(A,2): GOSUB 8810:E(A,
      2) = X
9130 Z = (3 * C(A,0) + 2 * C(A,7)
      + C(A,6) + 2 * C(A,5) + 2 *
      C(A,2)) / 10
9140 X = (Z + A(A) + AD(A,3)) / 1
      00 * D(A,3): GOSUB 8810:E(A,
      3) = X
9150 Z = (3 * C(A,0) + C(A,7) + 2
      * C(A,6) + 3 * C(A,8) + C(A
      ,4)) / 10
```

```
9160 X = (Z + A(A) + AD(A,4)) / 1
     00 * D(A,4): GOSUB 8810:E(A,
     4) = X
9170 Z = (3 * C(A,0) + C(A,7) + 2
      * C(A,6) + 3 * C(A,1) + C(A
     ,4)) / 10
9180 X = (Z + A(A) + AD(A,5)) / 1
     00 * D(A,5): GOSUB 8810:E(A,
     5) = X
9190 Z = (3 * C(A,0) + 2 * C(A,7)
      + 2 * C(A,6) + C(A,4) + C(A
     ,1) + C(A,5)) / 10
9200 X = (Z + A(A) + AD(A,6)) / 1
     00 * D(A,6): GOSUB 8810:E(A,
     6) = X
9210 Z = (2 * C(A,0) + C(A,7) + 3
      * C(A,6) + 4 * C(A,9)) / 10
9220 X = (Z + A(A) + AD(A,7)) / 1
     00 * D(A,7): GOSUB 8810:E(A,
     7) = X
9230 Z = (2 * C(A,0) + 2 * C(A,7)
      + 2 * C(A,6) + 4 * C(A,3)) /
     10
9240 X = (Z + A(A) + AD(A,8)) / 1
     00 * D(A,8): GOSUB 8810:E(A,
     8) = X
9250 Z = (3 * C(A,0) + 3 * C(A,7)
      + C(A,6) + 3 * C(A,1)) / 10
9260 X = (Z + A(A) + AD(A,9)) / 1
     00 * D(A,9): GOSUB 8810:E(A,
     9) = X
9270 Z = (C(A,0) + 2 * C(A,7) + 4
      * C(A,10) + 3 * C(A,11)) /
     10
9280 X = (Z + A(A) + AD(A,10)) /
     100 * D(A,10): GOSUB 8810:E(
     A,10) = X
9290 TC = 0:TA = 0
9300  FOR B = 1 TO 10
9310 Z = 85 + FN R(10) - 2 * B
9320 X = E(A,B) * Z / 100: GOSUB
     8810:CV = X
9330 X = (D(A,B) - E(A,B)) * Z /
     100: GOSUB 8810:OV = X
9340 TC = TC + CV:TA = TA + OV
9350  VTAB B + 4
9360  PRINT "(";: IF B < 10 THEN
      PRINT " ";
```

```
9370  PRINT B")"; TAB( 16 - LEN
      ( STR$ (OV)));OV; TAB( 24 -
      LEN ( STR$ (CV)));CV"....."
      D$(B)
9380  NEXT
9390  HTAB 10: PRINT "------";: HTAB
      18: PRINT "------": PRINT "F
      INAL"; TAB( 10);TA; TAB( 18)
      ;TC
9400  PRINT : PRINT
9410  PRINT "THE WINNER IS ";
9420  IF TC > (TA) THEN  PRINT N$
      (A): GOTO 9450
9430  IF TA > TC THEN  PRINT O$(A
      ):L = L + 1:L(L) = A: PRINT
      : PRINT N$(A)" IS DEFEATED":
      PRINT "AND IS OUT OF THE GA
      ME"
9440  IF TA = TC THEN  PRINT "RUN
      OFF ELECTION": GOTO 9290
9450  GOSUB 1460: NEXT A
9460  IF L = 0 THEN 9570
9470  FOR C = 1 TO L
9480  IF L(C) = P THEN 9530
9490  N$(C) = N$(P):A(C) = A(P)
9500  FOR A = 0 TO 16:C(C,A) = C(
      P,A): NEXT
9510  FOR A = 0 TO 10:D(C,A) = D(
      P,A):E(C,A) = E(P,A):F(C,A) =
      F(P,A): NEXT
9520  FOR A = 0 TO 7:B(C,A) = B(P
      ,A)
9530  P = P - 1: IF P < 1 THEN  HOME
      : TEXT : END
9540  NEXT C
9550  FOR A = 1 TO P: FOR X = 1 TO
      10:AD(A,X) = 0: NEXT X,A
9560  IF P = 0 THEN 440
9570  L = 0:L(1) = 0:L(2) = 0:L(3)
      = 0:L(4) = 0
9580  RETURN
```

DATA

```
10010  DATA "GENERAL PUBLIC  ","L
       ABOR          ","MANAGEMENT
             ","RETIRED PERSONS ","
       VETERANS      ","ENVIRONME
       NTAL     ","CONSERVATIVES    ",
       "LIBERALS              "
```

```
10020  DATA "GOVERNMENT      ","F
     ARMERS      ","WELFARE RI
     GHTS  ","RACKETEERS      "
10030  DATA  "AGRICULTURE","DEFE
     NSE","HEALTH AND HUMAN RESOU
     RCES","EDUCATION"
10040  DATA  "RELAXING ENVIRONMEN
     TAL CONTROLS ON NUCLEAR POWE
     R"
10050  DATA  "RESTRICTING GOVERNM
     ENT FUNDS FOR ABORTION"
10060  DATA  "INCREASING FOOD AID
      TO UNDERDEVELOPED NATIONS"
10070  DATA  "PLACING CONTROLS ON
      HANDGUNS"
10080  DATA  "TO DEVELOP A NEW MI
     LITARY WEAPON"
10090  DATA  "OFFERING MEDICAL CA
     RE TO THE POOR"
10100  DATA  "SUPPORTING MEDICAL
     CARE FOR GENERAL PUBLIC"
10110  DATA  "PLACING STRICT CONT
     ROLS ON LABOR UNIONS"
10120  DATA  "LIBERALIZING LABOR'
     S RIGHTS IN ORGANIZING"
10130  DATA  "INCREASING SOCIAL S
     ECURITY BENEFITS"
10140  DATA  "INCREASING PAY FOR
     GOVERNMENT EMPLOYEES"
10150  DATA  "PLACING STRICT CONT
     ROLS ON WELFARE RECIPIENTS"
10160  DATA  "LIBERALIZING THE RI
     GHT TO WELFARE BENEFITS"
10170  DATA  "ELIMINATING FOREIGN
      AID TO NON-DEMOCRATIC NATIO
     NS"
10180  DATA  "PLACING STRICT CONT
     ROLS ON STRIP MINING"
10190  DATA  "PLACING HIGH TARIFF
     S ON MANUFACTURED GOODS"
10200  DATA  "PROMOTING TRADE THR
     OUGH LOW TARIFFS"
10210  DATA  "INVESTIGATING ORGAN
     IZED CRIME"
10220  DATA  "PROVIDING LOW RENT
     HOUSING FOR POOR AND ELDERLY
     "
10230  DATA  "ESTABLISHING NEW NA
     TIONAL PARKS"
10240  DATA  40,8,8,0,0,1,7,1,0,0
     ,0,0
10250  DATA  40,0,3,0,0,0,8,1,3,0
     .0.0
```

```
10260 DATA 40,0,0,0,0,0,3,8,0,8
,0,0
10270 DATA 45,0,0,0,3,0,2,9,0,0
,0,0
10280 DATA 40,8,9,0,8,0,9,1,0,0
,0,0
10290 DATA 30,8,0,7,0,0,2,9,0,0
,0,0
10300 DATA 35,8,3,8,0,0,1,8,0,0
,0,0
10310 DATA 45,1,9,0,0,0,9,1,2,0
,0,3
10320 DATA 35,9,1,0,0,0,3,8,8,0
,0,0
10330 DATA 45,7,3,9,7,0,2,9,0,7
,0,0
10340 DATA 30,8,3,7,8,0,3,7,9,0
,0,0
10350 DATA 45,0,0,0,7,0,9,1,0,0
,1,0
10360 DATA 30,0,2,0,3,0,1,8,7,0
,9,0
10370 DATA 45,0,0,0,0,0,7,3,0,3
,0,0
10380 DATA 40,3,3,0,0,9,2,8,0,7
,0,0
10390 DATA 40,8,3,0,0,0,2,7,0,2
,0,0
10400 DATA 40,3,8,0,0,0,9,3,0,8
,3,0
10410 DATA 45,0,7,0,0,0,9,7,7,0
,7,1
10420 DATA 45,9,0,8,7,0,1,8,7,0
,8,7
10430 DATA 45,7,0,8,0,8,3,7,0,0
,3,0
10440 DATA 10,10,2,2,2,8,5,8,2,
0,50
10450 DATA 40,200,300,50
10460 DATA 1,2,1,0,1,1,2,2,1,2,
1,0,0,2,2,2,1,1,1,2
10470 DATA "ON THE TV SHOW
-PASSION FOR ADULTERY-","ON
THE EVENING TV NEWS", "ON TH
E TV SHOW -MAYHEM IN  BEDLA
M-","ON RADIO KRAP","ON RADI
O WNEW","IN THE DAILY SCANDA
L","IN THE MORNING JOURNAL"
10480 DATA
                    "IN THE M
ILITANT MILLWORKER","ON BILL
BOARDS","ON HANDBILLS"
```

```
10490  DATA  "BLANK","SMYTHERS",
     "KENNEDY","SUMMERS"
10500  DATA  "PROFESSIONS","TECH
     NICAL","WH. COLLAR","DEFENSE
     ","INDUSTRY","SERVICE","FARM
     ERS","RETIRED","UNEMPLOYED",
     "WELFARE"
```

Determine donators

```
20020  IF  RIGHT$ (LF$(C),3) = "+
     ++" THEN LF$(C) =  LEFT$ (LF
     $(C), LEN (LF$(C)) - 3) + "$
     $$"
20030  IF  RIGHT$ (LF$(C),2) = "+
     +" THEN LF$(C) =  LEFT$ (LF$
     (C), LEN (LF$(C)) - 2) + "$$
     "
20040  RETURN
```

Select advertising expenditure.

```
30020 VT = TL: VTAB TL
30030  FLASH : HTAB 2: PRINT ">";
     : NORMAL
30040  GOSUB 80: IF KB$ <  >  CHR$
     (8) AND KB$ <  >  CHR$ (13) AND
     KB$ <  >  CHR$ (21) AND KB$ <
      >  CHR$ (27) THEN 30040
30050  IF KB$ =  CHR$ (13) THEN I
     = VT - TL + 1 - 1 * (VT > L
     1) - 1 * (VT > L2) - 1 * (VT
     > L3): RETURN
30060  IF KB$ =  CHR$ (8) THEN VT
     = VT - 1
30070  IF KB$ =  CHR$ (21) THEN V
     T = VT + 1
30080  IF KB$ =  CHR$ (27) THEN  POP
     : GOTO 5300
30090  IF (VT = L1 OR VT = L2 OR
     VT = L3) THEN VT = VT - 1 *
     (KB$ =  CHR$ (8)) + 1 * (KB$
      =  CHR$ (21))
30100  IF VT < TL THEN VT = TL
30110  IF VT > BL THEN VT = BL
30120  HTAB 2: PRINT " ";: VTAB V
     T: GOTO 30030
```

FORTE

ENJOY MAKING YOUR OWN BEAUTIFUL MUSIC!

FORTE is an interpretive language devoted to the playing of music, which allows the operator to use the music playing capabilities of the Apple II* in a way that, up until now, required hours of tedious calculations and coding. Now, with FORTE, all the hard work is done for you.

Programs written in FORTE are as easy to enter, list and edit as are programs written in APPLE's* Integer BASIC.

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Integer BASIC

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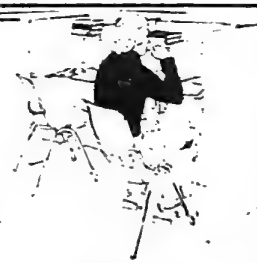

APPILOT EDU-DISK

APPILOT is an Apple II* version of the standard C.A.I. language PILOT. APPILOT is a dialogue-oriented language and includes color graphic commands, a musical mini language and disk commands for lesson segmentation. Designed for "Turnkey" operation, APPILOT includes a program editor, program interpretor and extensive on-line HELP lessons to instruct the user on all aspects of program development. Manual included.

Disk, 32K, $49.95

Integer BASIC

The Software Exchange

6 South Street, Box 68, Milford, NH 03055 603-673-5144

FASTGAMMON

Backgammon is a two-person game.
In FASTGAMMON the computer is one player
(its men are O's) and you are the other (your men are X's).

Whether you are a beginner or an experienced backgammon player, FASTGAMMON can help you improve your game. First of all, you now have an opponent that is always ready and willing to play. There is no substitute for experience — the more games you play the more you learn about backgammon. But there is another unique method by which FASTGAMMON can help you improve your game.

By selecting "2" when the starting message is displayed, the same sequence of rolls that occurred in the game just played (the last game for which you selected "1") will occur again.

HOW GOOD IS FASTGAMMON?

We make no claims that FASTGAMMON plays at an expert level. In fact, good players will notice obvious mistakes that the computer makes from time to time. The game of backgammon has many subtleties, and the algorithm programmed into version 1 of FASTGAMMON is a fairly simple one. There is an advantage that the computer has, however, over human players — the computer never forgets what it "knows". Due to oversights, distractions, or haste, human players often forget what they know. This fact is the edge that makes FASTGAMMON competitive against good players. 16K $19.95

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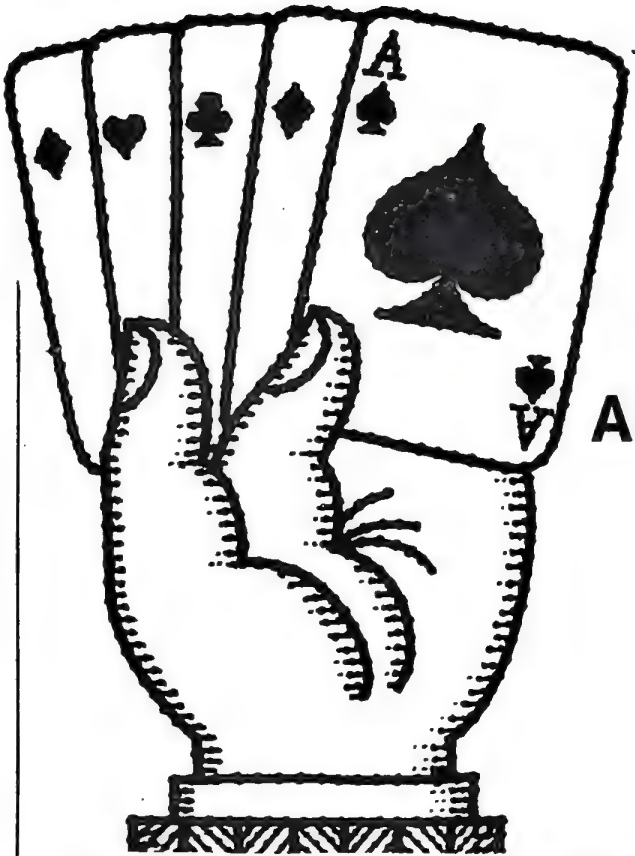

APPLE 21

A true Las Vegas Blackjack game with Hi-Res playing cards. One to three players can challenge the "dealer" to win on the table. Keeps track of all your winnings and losses and gives you a balance when you leave the table. Choose table limit, maximums; house "loans" you money when you're broke.

Apple II, Integer, 24K, $9.95

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SOFTAPE™

Apple Unveils APPLE III System for Business, WP Applications

by

Mike Sullivan

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Apple Computer Inc. revealed their new Apple III system for small business at regional dealer meetings last month. The new machines, which will start shipping in July, come bundled with applications software for word processing (WP), and small business management.

Specific hardware specs from Apple are sketchy at this time, but it is known that the new machine has these features:

*** A new processor which executes a superset of the 6502 instruction set, now used in the Apple II computer.

*** Up to 128K-Bytes of random-access memory (RAM).

*** A single 5.25" mini-floppy disk drive built into the computer, with controllers for three more.

*** A 16-bit analog-to-digital converter for use with voice or music.

*** A 12" (diag.) black-and-white monitor, with provisions for connection to an external color display.

*** A 73-key keyboard with numeric pad and special-function keys, including two user-definable keys. According to preliminary information, upper/lower case display on 24 lines of 80 characters is provided. All keys have hold-and-repeat function.

*** Eight peripheral slots for future I/O expansion, or for use with available printers, modems, etc.

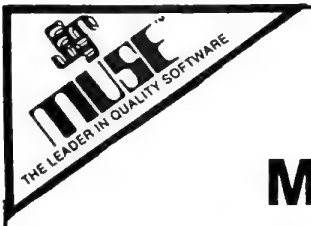
Software-compatible with Apple II programs, (it comes with an Apple II emulator) and touted by the manufacturer as "the industry's most powerful personal computer", the Apple III is Apple's entry into the $3500 to $10,000 range of micros that they feel will dominate the dollar volume of small computers in the coming five years. The introduction comes less than 60 days after Apple pulled out all their distributors and went completely to factory-to-dealer distribution, a move said by Apple at the time to improve their ability to support their "future high-technology products". Apple spokesmen stated in February that the firm was developing products for the $5,000-plus market share, with which other makers such as Tandy (Radio Shack), Cromemco, North Star, and others have been doing very well. Until the first week of May, spokesmen for Apple in Cupertino, CA would not let on that they had another machine in the works. Rumors had been flying since January that the three-year-old, privately-held company would introduce a mate for it's popular Apple II micro. Some reports had stated that the offering

would be PASCAL-based with 8" floppy disks for storage, and other sources stated the machine would incorporate bit-slice technology.

The Apple III is presently packaged in two versions, one aimed at WP and the other targeted for accounting. The accounting system, dubbed The Information Analyst, comes complete with 96K bytes of RAM and an integrated 5.25" floppy drive. System software includes Apple's new Sophisticated Operating System (SOS), Apple Business BASIC language, Visicalc III, (an enhanced release of Personal Software's Visicalc program), and a simple data handling system called Mail List Manager. Priced at $4,000 and up, the Information Analyst system may include printers or additional disk drives. Shipments to computer dealers should begin by mid-June, with production quantities slated for September.

Apple's other Apple III package is called The Word Processor System, and is targeted at WP applications. The two systems differ only in software, and the addition of a second disk drive (outboard) in the WP system. Each floppy is said to be able to store 60 screens of text (appoximately 115K bytes/diskette). The WP system will range from $5,400 with the thermal-paper Silentype printer, to $7,600 and up for daisy-wheel or other letter-quality printers.

The systems' power comes from a single supply, as in the Apple II, so that several peripherals may be powered from the CPU. Also, Apple designed a hidden 'RESET' key which should eliminate inadvertent system dives, long a problem on their first machine.



DR.
MEMORY

DR. MEMORY, Disk Word Processor allows the user to insert, delete, change, find, merge and block move text. DR. MEMORY controls left and right margins, inter-line spacing, end-of-page eject, automatic paragraphing, right margin justification, and paragraph indentation. With DR. MEMORY, you can also print UPPER and lower case characters without the need for any additional hardware. This is a highly efficient assembly language program that occupies less than 4K and can be operated at normal typing speeds. DR. MEMORY includes a separate documentation manula plus on-line "Help" reference.

Integer BASIC

Disk, 32K, $49.95

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MUSE™ SOFTWARE
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Bring the excitement of Major League baseball to your APPLE II.* BASEBALL is a high resolution action game with outstanding player control. Strikes and outs are tallied and a scoreboard is displayed after every batter. So get up to bat, watch out for those slow pitches, hit the ball and hope that the opposing team doesn't catch it. A challenging game and a must for sports fans.

Cassette, 16K, Applesoft,* $14.95

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PLAY BRIDGE WITH YOUR COMPUTER!!

You and the dummy play 4-person Contract Bridge against the computer. The program will deal hands at random or according to your criterion for high card points. You can review tricks, swap sides or replay hands when the cards are known.

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- Complete, illustrated manual in a three ring binder
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- Create, add, update, or delete files easily.
- Search any field for any data.
- Sort by any field.
- Print reports, selecting any fields in any order, and maintain totals and subtotals on any numberic fields.
- Print mailing labels.
- Print records selectively, for example, only customers with New York addresses.
- Codes printed on screen refer you to manual for explanation at all times½
- Complete index in manual.
- Scan function to report statistically on file. You might ask how many accounts are overdue and receive a report that stated 10 records found in 200 records scanned (5% of file).
- Automatically tests line printer ready state to avoid system lockup.
- Printer alignment pattern for labels.
- Warning issued if you try to compact data without creating a backup. (You can ignore warning).

Applesoft ROM Disk 32K

$99.95 + $2.00 shipping

Apple Version works in conjunction with Visicalc

TSE **The Software Exchange**

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BUGS, WORMS, AND OTHER UNDESIRABLES

Although all our program listings are taken directly from working and tested computer versions, we occasionally find ways to let errors slip in. We are becoming increasingly aware of potential problem areas due to the feedback we've received, and we are grateful to those of you who have helped.

From the June issue:

In the Apple Graphics article, page 13, line 40 should be

```
40  READ X(I),Y(I)
```

In the ROUTER program, page 34, part of line 110 was cut. It is a PRINT statement.

The DODGER program calls a sound subroutine from Programmers' Aid #1. If you do not have this option, a short list of modifications follows that will put a different sound routine in its place.

And lastly, concerning the INVADERS program from the May issue; yes, it does run as published. Most problems from people who have called were results of mistypes in the last 10 statements (data). The program as published does require more than 16K and won't work with RAM Applesoft. Fortunately, Dirk Rietveld, from Amsterdam, Holland, and Larry Betts, from Eldrige, Iowa, came through with solutions to the 16K problem within a day of one another (yes, we reach all corners of the world...). Change the following 2 lines if you only have 16K and you'll have an INVADERS program:

```
 50  POKE 232,0 : POKE 233,30
1810  L=7680
```

Alternate DODGER sound routine:

Delete lines 490, 1420, 1430, 1560. Use the following lines:

```
480 MUSIC=2:PITCH=0:TIME=1
481 POKE 2,173: POKE 3,48: POKE
    4,192: POKE 5,136: POKE 6,208
    : POKE 7,4: POKE 8,198: POKE
    9,1: POKE 10,240
```

```
 482 POKE 11,8: POKE 12,202: POKE
     13,208: POKE 14,246: POKE 15
     ,166: POKE 16,0: POKE 17,76
     : POKE 18,2: POKE 19,0: POKE
     20,96
1320 POKE TIME,6: POKE PITCH,50:
      CALL MUSIC
1400 POKE TIME,4: POKE PITCH,200
     : CALL MUSIC
1410 POKE TIME,6: POKE PITCH,50:
      CALL MUSIC
1460 POKE TIME,10: POKE PITCH,150
     : CALL MUSIC
1480 POKE TIME,4: POKE PITCH,75:
      CALL MUSIC
1550 POKE TIME,3: POKE PITCH,250
     : CALL MUSIC
```


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Gives Apple II the power of speech WITHOUT hardware costs...*

The APPLETALKER accepts voice or audio information through the cassette import port, digitizes the information and stores it in numbered tables in your computer's memory for later playback using Apple's* on-board speaker. You can also SAVE tables to tape for later use. Comes complete with all the routines and instruction you will need. Demo program also supplied.

Apple II*, Integer, 16K **$15.95**

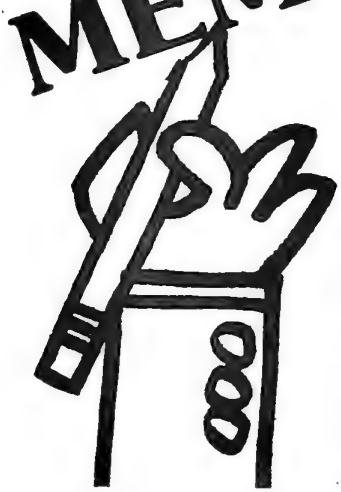
APPLE-LIS'NER

Your computer can hear as well as talk! Software speach recognition for the Apple II*. Make your own programs!

Apple II*, Integer, 16K, **$15.95**

SOFTAPE ™

MEMO CALENDAR



MEMO CALENDAR is designed to perform the functions of a diary and a memo pad. You enter in a memo and assign a date to it. You can call up all the memos assigned to any date on the screen at any time and add or delete without disturbing any other memo. This program works in conjunction with Mt Hardware Apple Clock to automatically call forth the current day's memos. You can store up to 500 different dates and approximately 1000 memos. Any memo can be recalled within 3 seconds.

Requires: 32K Apple w/AS-ROM, A2+, or LANGUAGE card; disk $29.95

from PERIPHERALS UNLIMITED software

FORM LETTER

Combines files from the TEXT EDITOR and MAILING LIST programs to enable the user to print out customized letter — such as advertising, notices, and so on. A model letter is created using the TEXT EDITOR and special character lines within the body of the letter. When FORM LETTER is run, it replaces these special characters by information contained in the MAILING LIST records. For example, if the model letter contains "Dear $FIRSTNAME," and the MAILING LIST has an entry for 'John Jones' then the finished letter will read "Dear John". Letters can be printed out for any range of records: last names beginning with A through K, or Zip codes 60000 through 70000, or records with a specific code word.

Requires:

48 Apple W/AS-ROM, A2+, or LANGUAGE card; disk . . . $24.95

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MYSTERY FUN HOUSE

A SCOTT ADAMS ADVENTURE

The lure of a Fun House is the unexpected when you least expect it, and this adventure is true to tradition. It takes all your ingenuity just to get past the ticket counter, so prepare yourself for many thrilling and challenging hours in Scott Adam's Fun House!

24 K Machine Language
Cassette $14.95

TSE

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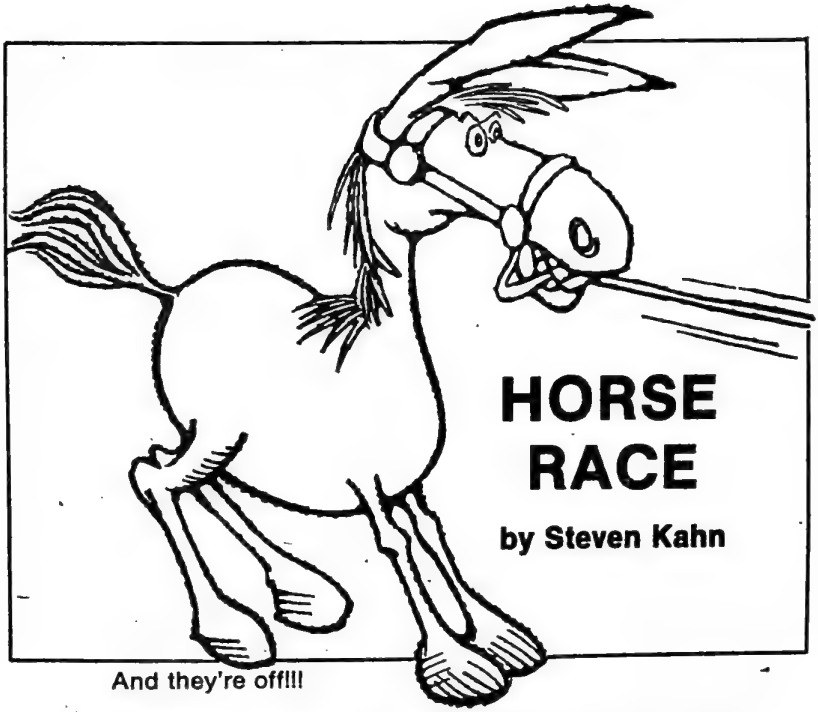
(603) 673-5144



HORSE RACE

by Steven Kahn

And they're off!!!

Have you ever been to the racetrack and come home feeling a few dollars lighter? Somehow it seems fun while you're there, but some of the excitement is lost upon surveying the damages. Here's a way to capture some of the excitement of the races and still have money to buy that new adventure game you've been wanting. Feel free to provide your own names for the horses in Lines 2000 to 2030.

Here they come, spinning out of the turrrn!.....

Applesoft

```
]LIST

10  TEXT : HOME
15  DIM N$(27)
20  FOR I = 0 TO 27: READ N$(I): NEXT

30  PRINT "WELCOME TO VIDEO DOWNS
    !"
```

```
50  PRINT : PRINT : INPUT "HOW MA
     NY PLAYERS ";W
90  FOR Y = 1 TO W: PRINT : PRINT
     "NAME OF PLAYER ";Y;" ";: INPUT
     B$(Y): NEXT
110  FOR U = 1 TO W:B(U) = 1000: NEXT

130  FOR L = 1 TO 5:S =  INT (30 *
      RND (1)) + 1:R(L) = S: NEXT

150  HOME
170  INVERSE : PRINT "P A Y O F F
      S  F O R  H O R S E S": NORMAL

190  FOR Y = 1 TO 5
195 N =  INT ( RND (1) * 28):SW =
     0
200  FOR J = 1 TO Y - 1: IF N(J) =
     N THEN SW = 1
205  NEXT J: IF SW = 1 THEN 195
210  PRINT : HTAB 3
220 N(Y) = N
230  PRINT Y;") ";N$(N(Y));" PAYS
      ";R(Y);" TO 1": NEXT Y
250  FOR Y = 1 TO W: PRINT : VTAB
     14: PRINT B$(Y);"  ";"HAS  $
     ";B(Y)
270  PRINT : INPUT "HOW MUCH DO Y
     OU WANT TO BET? ";P(Y): IF P
     (Y) <  = B(Y) THEN 290
280  PRINT "COME ON, YOU DON'T HA
     VE THAT MUCH.": GOTO 270
290  PRINT : INPUT "WHICH NUMBER
     HORSE? ";Z(Y): IF Z(Y) > 5 THEN
     290
310  FOR Q1 = 14 TO 21
330  VTAB Q1: PRINT "

     "
```

```
350  NEXT : NEXT
370  HOME : GR
390  COLOR= 12: FOR I = 0 TO 39: HLIN
     0,39 AT I: NEXT I
410 A = 1:X(1) = 2:Y(1) = 2:C(1) =
     2: COLOR= 2: GOSUB 550
430 A = 2:X(2) = 2:Y(2) = 10: COLOR=
     7:C(2) = 7: GOSUB 550
450 A = 3:X(3) = 2:Y(3) = 18: COLOR=
     8:C(3) = 8: GOSUB 550
470 A = 4:X(4) = 2:Y(4) = 26: COLOR=
     13:C(4) = 13: GOSUB 550
490 A = 5:X(5) = 2:Y(5) = 34: COLOR=
     1:C(5) = 1: GOSUB 550
510 A =  INT (5 *  RND (1)) + 1: GOSUB
     630
530  GOTO 510
550  PLOT X(A) + 1,Y(A) - 1: PLOT
     X(A) + 2,Y(A) - 1: PLOT X(A)
      - 2,Y(A): PLOT X(A) - 1,Y(A
     ): PLOT X(A),Y(A): PLOT X(A)
      + 1,Y(A)
570  PLOT X(A) - 2,Y(A) + 1: PLOT
     X(A) - 1,Y(A) + 1: PLOT X(A)
     ,Y(A) + 1: PLOT X(A) + 1,Y(A
     ) + 1
590  PLOT X(A) - 2,Y(A) + 2: PLOT
     X(A) - 2,Y(A) + 3: PLOT X(A)
      + 1,Y(A) + 2: PLOT X(A) + 1
     ,Y(A) + 3
610  RETURN
630  COLOR= 12: GOSUB 550:B =  INT
     ( RND (1) * 3 / R(A) ^ .25) +
     1:X(A) = X(A) + B: IF X(A) <
      = 37 THEN  COLOR= C(A): GOSUB
     550: RETURN
650 T = A
670  GOTO 930
```

```
930  TEXT : HOME : INVERSE : PRINT
     "* * * * * WINNINGS AND LOSI
     NGS * * * * *": NORMAL
950  PRINT : PRINT "THE WINNER IS
      NUMBER ";T;", ";N$(N(T))
970  FOR Y = 1 TO W: PRINT : IF T
      = Z(Y) THEN L = T: PRINT B$
     (Y);" HAS WON  $";P(Y) * R(L
     ):B(Y) = B(Y) + (P(Y) * (R(L
     ) - 1)): GOTO 1010
990  PRINT B$(Y);" HAS LOST  $";P
     (Y):B(Y) = B(Y) - P(Y)
1010  NEXT : PRINT : PRINT "ANOTH
     ER RACE (Y/N) ";: INPUT F$: IF
     F$ = "Y" THEN 130: END
2000  DATA  "LIGHTNING FLASH","DA
     DDY'S LITTLE FILLY", "GLUE F
     ACTORY", "DOG CHOW", "CHECKE
     RS", "HONEY BEE"
2010  DATA  "FOOT LOCKER", "PATTY
      MELT", "MEADOW MUFFIN", "BU
     FFALO CHIPS","ALL AGLOW","ME
     RCHANT MARINE"
2020  DATA "IGLOO","ICE PACK","RO
     CKY ROAD","HAYWIRE","NASHUA
     PRIDE","HOME STRETCH","SANDL
     EFOOT","ONION BREATH"
2030  DATA  "SADDLE SORES","MUSTA
     RD PLASTER","BARNSTORMER","G
     RAIN BELLY","HOOF'N MOUTH","
     BONEY BACK","CHUBBY RUMP","S
     IDE SADDLE"
```

FOR THE APPLE II

Hayden Book Company, Inc.

Game Playing with BASIC, Tape 1 -- features 10 recreational and educational programs: Coin Toss, Coin by Coin; Coin Toss with Summary; Rolling One Die; Rolling Two Dice; Seven/Eleven; Mouse in a Maze; A Random Walk; Battle of the Numbers; Dealing a Poker Hand; and Tic-Tac-Toe. $9.95

Game Playing with BASIC, Tape 2 -- features 9 programs: Knight's Tour; Guess the Number; Prime Numbers 1; Prime Numbers 2: Chinese Remainder Theorem; Perfect Numbers; Fibonacci Numbers; Square Numbers; and Armstrong Numbers. $9.95

Game Playing with BASIC, Tape 3 -- features these 8 programs: Slot Machines; Blackjack; Roll the Dice; Towers of Hanoi; 15 Puzzle; Buried Treasure; Odd Cell Magic Square; and 4 x 4 Magic Square. $9.95

General Mathematics-1 -- features these 13 programs: Log to Any Base; New Coordinates; Rectangular Polar Coordinates; Permutations; Vector Cross-Products; Max/Min Locator; Number Rounder; Dimension Scaler; Histogram; Circle Finder; Nth Root of a Number; Normally Distributed Random Numbers; and Rational Fractions. $14.95

Engineering Mathematics-1 -- features these 8 programs: Solving Simultaneous Equations; Evaluation of a Polynomial; Quadratic Equations; Integration by Simpson's Rule; Newton-Raphson Roots; Derivative of a Function; Factorial of a Given Number; and Extended Factorial Calculation. $14.95

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MAILING LIST

from
PERIPHERALS UNLIMITED
software

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Holds up to 500 names and addresses per diskette. You can split files between diskettes, permitting you to store A-K on one disk, L-R on another, and S-Z on a third. This gives almost unlimited storage. It is very fast and can search and locate any name within 3 seconds. Entries can be sorted alphabetically or by zip code within 2 seconds for a complete diskette. It features user control of printed output, recognition of duplicate names, and 7 entry fields. Names may be displayed on the screen as a powerful "address book". This program may be used with the **Form Letter** program to print out personalized letters.

Requires: 48K Apple w/AS-ROM, A2+, or LANGUAGE card; disk $39.95

SOFTWARE REVIEWS

by Mark Pelczarski

It's always fun to get new toys, and when I arrived here two weeks ago I found myself with an entire stock room of programs I hadn't yet seen. It will obviously take quite a while to wade through all of them, especially with other responsibilities, including reviewing submissions and new commercial programs for possible publication or distribution; but don't think that all we do is play games. Picture, if you will, a desk covered with papers and a barely visible keyboard, a small slot nearby, and a television screen peering out from a stack of magazines and envelopes. You've found my current state. I am gratified by the fact that the wonderful people down in the Art Department have yet to throw me out the window after having come downstairs every half hour with another article or alteration two days before a magazine and catalog both go to press. Anyway, here's commentary on a few programs.

Global War by MUSE

Have you ever played RISK? One of my favorite games has found its way into a computer version. For 2—9 players, the object is simply world conquest. Geographically, the continents of the world are divided into territories. You control placement and movement of armies, and when and where attacks are made. The computer acts as your source of information, capable of displaying the status of any player, continent, or territory, or a high resolution map of the entire "game board".

I found the computer implelmentation of the game acceptable. Being accustomed to the board game I did miss being able to observe the entire board status throughout every step of the game. Initially, keying the steps involved in playing seemed awkward, but again that is based on the habit of playing the board version. An advantage of the computer version is the ability to save a game in progress—the game itself can take a few hours, which is occasionally much for one sitting. Global War requires a disk, Applesoft ROM, and 48K.

Sargon II by Dan and Kathe Spracklen

If you have read anything about computer chess recently not much needs to be said about this program. I'd had a version of the original Sargon program for the Apple, and Sargon II is only better. The original Sargon was challenging, and Sargon II seems faster and a better player. You can read as much as you want about how well the computer games fare against each other (and, if you hadn't heard, Sargon II does...quite well), but the real test is sitting and playing against them. The first computer chess game I tried, Microchess 2.0, I found a pitiful opponent. Few other imitations fared well. Sargon plays chess.

There are seven levels of play

available, with response times ranging from immediate to 4 hours. (The average response time changes as follows: Immediate, 20 seconds, 1 minute, 2 minutes, 6 minutes, 40 minutes, 4 hours). A couple of nice features include the ability to set up a game situation from which to play (great for chess by mail, but don't worry T.M., I won't...), and the ability to ask the computer for hints—what it would do in your situation.

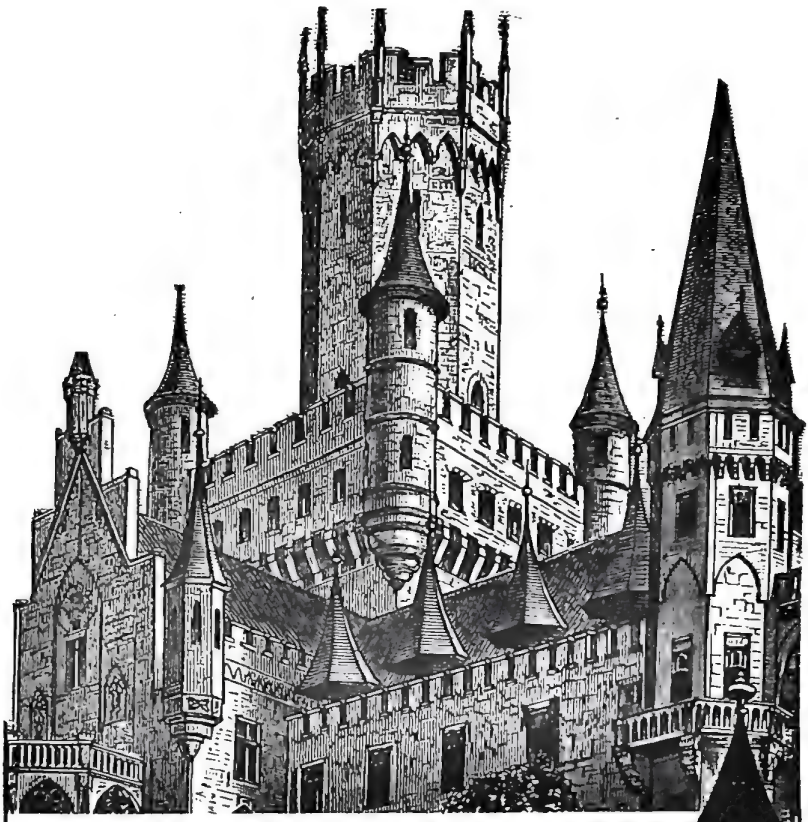
Sargon II will run on any 24K Apple, and is available on cassette or disk. Sargon I is also still available on cassette.

Maze Game from MUSE

I was admiring an interesting submission that James Garon had received for the TRS-80 when he noted that he'd seen something similar for the Apple. Upon poking around, I found Maze Game. Perhaps the reason it hadn't caught my eye earlier was its name (Oh, no...not another program that will draw mazes for you...), but this game puts you graphically at a mouse eye's view of a maze! You can select the dimensions of the maze at the beginning, and throughout have the option of seeing an overhead view of the map and choosing whether or not to see your old tracks. But to move around the maze you must work your way through a 3-D representation of the walls and passages from within. Maze Game is available on cassette for a 16K Integer BASIC machine, or on disk as part of a package called Best of MUSE, along with Tank War, Escape, Music Box, and Side Shows.

P.S. Escape is similar to Maze Game, except it's billed as more of an adventure-type game. The maze is a set size (large), and you run into people along the way who give you maps and compasses (which may be incorrect). You cannot see your location in the maze, which makes it much harder and maybe a little frustrating.

In addition to the programs mentioned above, here are a couple quick notes about 2 programs already reviewed by others in this magazine, which I finally got to see this month and really liked. Android Nim is one of the best graphic programs I've seen on the Apple. If you're looking for something interesting, simple, and flashy all at once, Android Nim is it. A great program for showing off your computer. And Visicalc IS a piece of software that actually justifies buying a computer. The capability of defining values as functions of other changeable numeric values, and then actually go back and change one and see everything else adjust automatically, is awesome. It comes highly recommended.



TWO ADVENTURES BY SCOTT ADAMS...

THE COUNT

You 're in Dracula's castle, and your mission is to destroy him and thereby rid the world of his evil.

VOODOO CASTLE

Remove a voodoo curse from Count Cristo and set him free forever!

Cassette 24K Machine Language

$14.95 each

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ADVENTURES

by Scott Adams

Adventures on Tape: *Level II, 16K*

- **Adventure Sampler**
  Short version of Adventureland, a great way to try out adventuring (but you'll get addicted!) $5.95
- **Adventureland**
  An enchanted world with 13 lost treasures guarded by magical beings. $14.95
- **Pirate's Cove**
  Clues in blood-soaked books, a pirate and his parrot, alligators, treasure $14.95
- **Mission Impossible**
  A chance to prevent the nuclear reactor from being destroyed by a saboteur's time bomb $14.95
- **The Count**
  Watch out! you're in Dracula's castle and you must destroy him before he bites you! $14.95
- **Voodoo Castle**
  Remove a curse from Count Christo $14.95
- **Strange Odyssey**
  Adventure in outer space in the ruins of an ancient alien civilization $14.95
- **Mystery Fun House**
  It will take all your ingenuity just to get past the ticket counter, and that's only the beginning! $14.95
- **Pyramid of Doom**
  In the shifting sands of the Sahara lies an ancient Pyramid, filled with Egyptian treaasures $14.95
- **Ghost Town**
  Steal the treasures from their ghostly guardians before nightfall $14.95

Apple II 24K

(programs are in Machine Language)

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APPLE GRAPHICS

by

Joan Truckenbrod

This is the second article in a series by Joan Truckenbrod, who teaches about computer graphics in the Art Department at Northern Illinois University.

Simulated Motion

a. Moving a figure across the screen. The translation operation facilitates the simulation of a figure in motion. This appearance of motion is created by translating the figure with sequential, small incremental steps. This is easily accomplished by using a loop to sequentially increment the X and Y coordinates of a figure and redraw it each time at its new location. Using this technique, a "path" can be left on the screen behind the moving figure, or each sequential figure can be erased prior to the drawing of the new figure to eliminate the effect of a path on the screen.

The following Applesoft example leaves a path behind the figure:

```
  5 REM Define the endpoints in your figure. NP is the
    number of points.
 10 NP=5
 20 DIM X(NP), Y(NP)
 30 FOR I = 1 TO NP
 40 READ X(I), Y(I)
 50 NEXT I
 60 DATA 3,2,8,2,8,7,3,7,3,2
 70 HGR
 80 HCOLOR = 7
100 REM This example moves a figure from top left to
    bottom right screen.
110 FOR I = 1 to 150
115 REM I is used as the horizontal translation factor and
    I/2 as the vertical translation factor.
120 HPLOT X(1) + I, Y(1) + I/2
130 FOR R = 2 TO NP
140 HPLOT TO X(R) + I, Y(R) + I/2
150 NEXT R
200 NEXT I
300 END
```

To eliminate the path behind the figure, erase each figure prior to drawing a new figure. This is done by redrawing the figure in the background color. Add the following lines to accomplish this.

```
155  REM an entry S loop is used to hold the figure on the
         screen for a small amount of time before it is erased.
160  FOR S = 1 to 150: NEXT S
170  HCOLOR = 0
180  HPLOT X(1) + I, Y(1) + I/2
190  FOR R = 2 to 25: HPLOT TO X(R) + I, Y(R) + I/2: NEXT R
```

b. Acceleration and speed. The previous example uses the same increment or translation factor to produce an even or regular speed or rhythm throughout the program. By sequentially increasing or decreasing the translation factor within a program, a sense of acceleration or deceleration in the movement of the figure can be achieved. Progressive series of values can be used to create this effect. The Fibonacci Series, in which each number is the sum of the two previous numbers, can effectively be used to create a sense of acceleration.

```
110  A = 0
115  B = .5
120  C = 0
130  FOR I = 1 to 10
140  HPLOT X(1) + C, Y(1)
150  FOR R = 2 TO NP
155  HPLOT TO X(R) + C, Y(R)
160  NEXT R
170  C = A + B
180  A = B
190  B = C
200  NEXT I
```

The use of progressive increments also creates a sense of depth on the screen as the figure appears to move out towards you. The effect of depth can be enhanced by increasing the size of the figure as it moves out towards the viewer.

Limitations

The high resolution screen is limited in the number of addressable points available and generates an error message if a horizontal limit of 279 or a vertical limit of 191 is exceeded. Also, if X or Y is less than zero, an error message is generated. To avoid this break in the execution of a program, it is advantageous to insert check statements to reroute program execution in the event that the X or Y plot values are not within the allowable range. Check statements should be inserted prior to the HPLOT statements. A subroutine is used here to avoid repeating the check statement.

```
120  REM the I loop represents the number of times the figure
         is to be repeated.
130  FOR I = 1 TO 10
140  R = 1: GOBUB 7000
150  HPLOT X(R) + TX, Y(R) + TY
```

```
160  REM the R loop represents the number of points in the
       figure.
170  FOR R = 2 TO NP
180  GOSUB 7000
190  HPLOT TO X(R) + TX, Y(R) + TY
200  NEXT R
500  END
7000 REM this subroutine checks the X and Y coordinate
       values to be plotted.
7010 IF X(R) + TX    279 OR X(R) + TX    0 THEN POP:
       GOTO 500
7020 IF Y(R) + TY    191 OR Y(R) + TY    0 THEN POP:
       GOTO 500
7030 RETURN
```

An alternative to ending the program when the X and Y limits are exceeded is to reverse the translation and move the figure in the opposite direction.

Program Structure

For ease in debugging a graphics program, it is advantageous to construct subroutines for each of the operations of translation, scaling, rotation and translation so they can be called independently or sequentially depending upon the desired graphic composition. During the debugging phase call only the subroutine that contains the operation you are working on. After all of the operations are debugged, you can call any or all of the operations that you wish to perform on your figure. When more than one operation is used, it is necessary to keep the plotting routine in a separate subroutine. In this instance a second set of X and Y arrays is used to hold the new modified coordinates while the original coordinates are in the original X and Y arrays.

Progressive Translation Sample Program

```
]LIST

100 NP = 5
105  DIM X(NP),Y(NP),X1(NP),Y1(NP
     )
110  HGR
120  HCOLOR= 7
125  FOR I = 1 TO NP
130  READ X(I),Y(I)
135  NEXT I
140  DATA  5,5,15,5,15,15,5,15,5,
     5
145  REM  FOUR POINTS DEFINE A BO
     X. THE FIRST POINT IS REPEAT
     ED FO THE PROGRAM TO DRAW TH
     E ENTIRE BOX.
150 A = 0:B = .5:C = 0
```

```
160   FOR S = 1 TO 20
170   REM  THIS LOOP REPRESENTS TH
      E NUMBER OF TIMES THE BOX IS
       REPEATED.
180   GOSUB 5000
190   GOSUB 9000
200 C = A + B:A = B:B = C
210   NEXT S
500   END
5000   REM  THIS SUBROUTINE CHANGE
      S THE X AND Y COORDINATES FO
      R THE TRANSLATED FIGURE.
5010   FOR I = 1 TO NP
5020  X1(I) = X(I) + C
5030  Y1(I) = Y(I) + C / 2
5040   REM  THE MODIFIED COORDINAT
      ES ARE IN THE X1 AND Y1 ARRA
      YS WITH THE ORIGINAL X AND Y
       VALUES LEFT UNCHANGED IN TH
      E X AND Y ARRAYS.
5050   GOSUB 7000
5060   NEXT I
5070   RETURN
7000   REM  THIS SUBROUTINE CHECKS
       THE X AND Y VALUES TO SEE I
      F THEY ARE IN THE ALLOWABLE
      AREA.
7010   IF X1(I) > 279 OR X1(I) < 0
       THEN  POP : GOTO 500
7020   IF Y1(I) > 191 OR Y1(I) < 0
       THEN  POP : GOTO 500
7030   RETURN
9000   REM  THIS SUBROUTINE PLOTS
      THE FIGURES.
9010   HPLOT X1(1),Y1(1)
9020   FOR R = 2 TO NP
9030   HPLOT  TO X1(R),Y1(R)
9040   NEXT R
9050   RETURN
```

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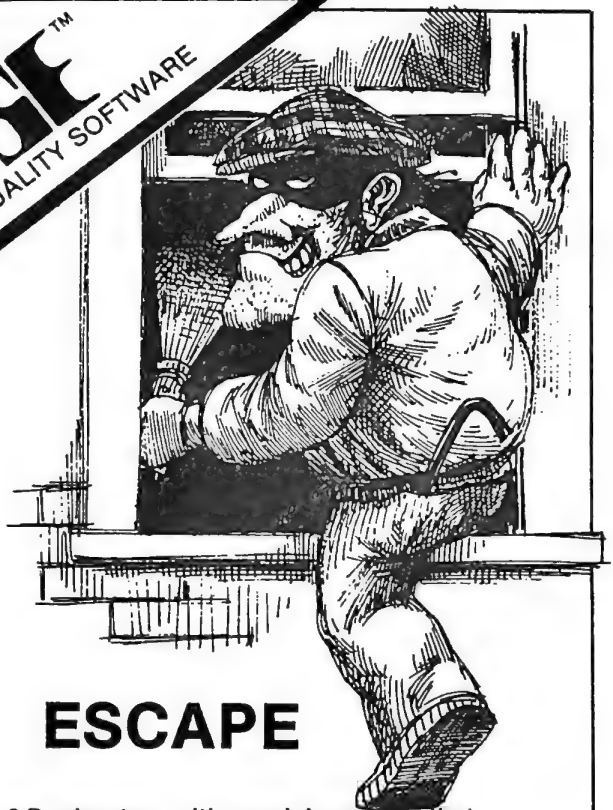

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